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USEFUL RECEIPTS.

On Varnishes.

In a recent number you published a formula for making a varnish unchangeable by any *ordinary* intrusion of water (as I would understand you). According to my experience of twelve years in such matters, I submit the following. Although in this instance I do not know what you mean by gum and water colors being so susceptible to the ruinous action of water, as there are so many kinds of gum, yet I presume you had reference to a spirit varnish containing a gum resin and any of the ordinary colors used by painters. I would state that according to my observation no spirit varnishes will stand the wet for a long time, and much less an aqueous solution of gum resins by an alkali. You will remember that water, potash, and shellac were at one time much used to stiffen hat bodies, and the compound went by the epithet of patent stiffening. My first hat happened to have it in, and unfortunately got caught in a shower, and ever after had the appearance of the fur on a recently drowned rat. The gum re-dissolving penetrating the silk. I have always found that oil and turpentine solutions of the gum resins, particularly copal, withstand the action of water and moisture best, but a varnish made of 8 lbs. gum damar, dissolved in 2½ gallons of spirits of turpentine is an excellent preparation for indoor work, or an article somewhat better but more expensive can be made as follows:—5 lbs. mastic, 4 oz. white bees wax, 2 gallons of spirits of turpentine. Mix carefully in a covered vessel subjected to a moderate heat. The addition of wax is intended to correct the brittleness of the varnish when dry, both useful as paint lustres. The pigments used in the preparation of water colors are mostly admissible in the manufacture of colored resin varnishes, some being clear while others are more or less opaque and are not easily affected by water if their particles are protected by a good varnish.

With regard to the new varnish, the only advantage I can see in the use of lime with the potash is to render the latter more caustic.

Yours, JNO. H. RASER.

Reading, Pa., Jan. 1st, 1853.

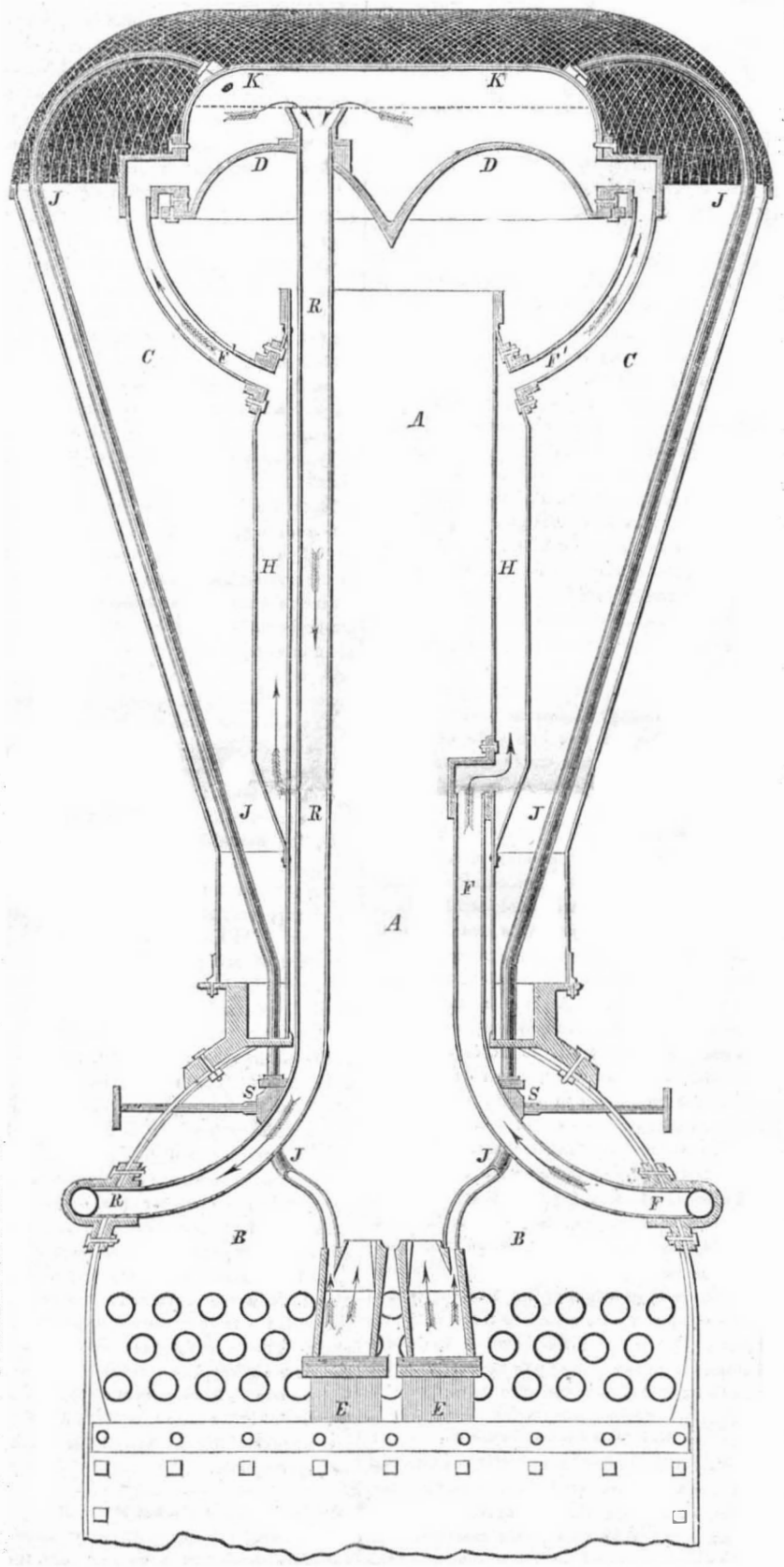
[The lime and potash make a caustic ley as alluded to by our correspondent. We are much obliged to Mr. Raser for his thoroughly practical information.

The Delaware and Raritan Canal Company are about commencing the enlargement of their canal. The whole line is to be made wider and deeper, and new locks built throughout, capable of passing vessels of five hundred tons burthen; making it, in reality, a ship channel. From four to five thousand men will be employed upon it, including many carpenters, masons, and blacksmiths.

Fine tooth combs are now made of India rubber.

Thefts of statuary have recently occurred in Greenwood Cemetery.

HEATING FEED WATER IN THE SMOKE-PIPE OF LOCOMOTIVES.



The above engraving represents a transverse vertical and central section of a locomotive chimney and smoke box and its exhaust steam or blast pipes, with the Apparatus for Heating Feed Water attached thereto, invented by Israel P. Magoon, of St. Johnsbury, Caledonia Co., Vermont, and patented Sept. 7th, 1852.

B represents the front end of the boiler; E E the exhaust pipes; A the inner smoke or cone pipe; C the outer or external chimney, and D the deflector or cone, all of which are usually found in modern locomotives. H represents a hollow cylinder of sheet-iron larger than the smoke pipe which it completely surrounds, and to which at top and bottom it is attached water tight, leaving a space between it and the smoke pipe of about two inches; K is an inverted bowl-shaped vessel of cast-iron attached, also water tight, by a flange to the outer and lower edge of the deflector or cone, and with it forming a water vessel of about fifteen gallons capacity, and connected by the pipes F′ F′ to the top of the cylinder, H; F is a pipe (two inches in diameter) leading from a force pump on the left side of the engine, and along the side of the boiler to the smoke box which it enters as seen in the figure, and opens at its upper end into the lower part of the cylinder, H; R is a pipe of the same diameter as F, having its mouth within the vessel, K, 2½ inches above the highest part of the deflector or cone, thence leading down through or inside the smoke-pipe and smoke-box to the right side of the boiler along which it passes and connects at its hindmost end with the tank of the tender by a flexible hose; J J are two small pipes (three-eight inch internal diameter,) opening from an orifice in the top of the exhaust pipes, thence leading up between the smoke pipe and outer chimney and into the vessel, K, above the mouth of the return pipe, R, and furnished in smoke-box with stop-cocks, S S, which are opened when additional heat is needed in the vessel, K, and shut when the engine cylinders are oiled, to prevent any oil or grease from passing with the steam into the vessel, K, and through it into the tank.

The action of the apparatus will be readily understood as follows, water drawn from the tank by the pump on the left side of the engine will be forced up through the pipe, F, into the cylinder, H, till that is completely filled, thence through the curved pipes F′ F′ in the direction of the arrows into the vessel K, which it also fills to the mouth of the pipe, R, or a little above the dotted line when by its own weight it descends through that pipe and into the tank on the right side, thus keeping up, while the engine is running, a constant circulation of the water from the tank up through the heating apparatus and back again to the tank. A small part of the exhaust steam also is thrown up through the jet pipes, J J, into the vessel, K, condensed there, imparting its additional heat, and with the water passing back to the tank. It will be seen that the water while passing up through the feed pipe, F, the cylinder, H, the connecting pipes, F′ F′, vessel K, and down the return pipe, R, is exposed to all the hot-air, gases, smoke, and exhaust steam, which, after leaving the boiler and cylinders are driven up through the smoke-pipe, A, against the deflector, D, and from under it out into the open air. It thus rapidly receives a considerable quantity of heat which otherwise passes off and is lost, effecting quite a material saving of fuel. Additional information can be obtained by addressing Magoon & Prince, proprietors, St Johnsbury, Caledonia Co., Vt.

The Mechanics and Men of Literature in New York.

In our last number, in a few words, we stated that Hon. John A. Dix had delivered a lecture before the New York Mechanics Institute, on a subject relating to the mechanical classes, and that his lecture was not well attended. We rebuked our mechanics for their apathy and want of taste; but the most keen rebuke which they have received comes from another quarter and in a different manner.—The Hon. Ex-Senator, U. S., delivered a lecture in Metropolitan Hall, on the evening of the 6th inst., before the New York Historical Society, which embraces the most learned and distinguished gentlemen in our city. Instead of having a thin audience in that Hall, which is ten times larger than the rooms of the Institute, the hall was well filled and the audience very large. We are afraid that too many of our young mechanics go to hear songs and see mountebank exhibitions in preference to attending scientific lectures. Mechanics with families cannot attend lectures with the same convenience that persons of wealth can, but from their numbers in New York they ought to crowd the largest Hall in the city, whenever a lecture respecting their interests is delivered.

Fatal Accident.

An accident lately occurred at the brewery of Mr. Sietz, in Easton, Pa., Phillip Winner, one of the hands, went into the cellar, and accidentally slipped into an ale vat which had been left open for the gas to escape. He was overcome by the effects of the gas, and when removed life was extinct.

The Atlantic is nearly four miles deep off Cape Hatteras, so say the U. S. Coast Surveyors.

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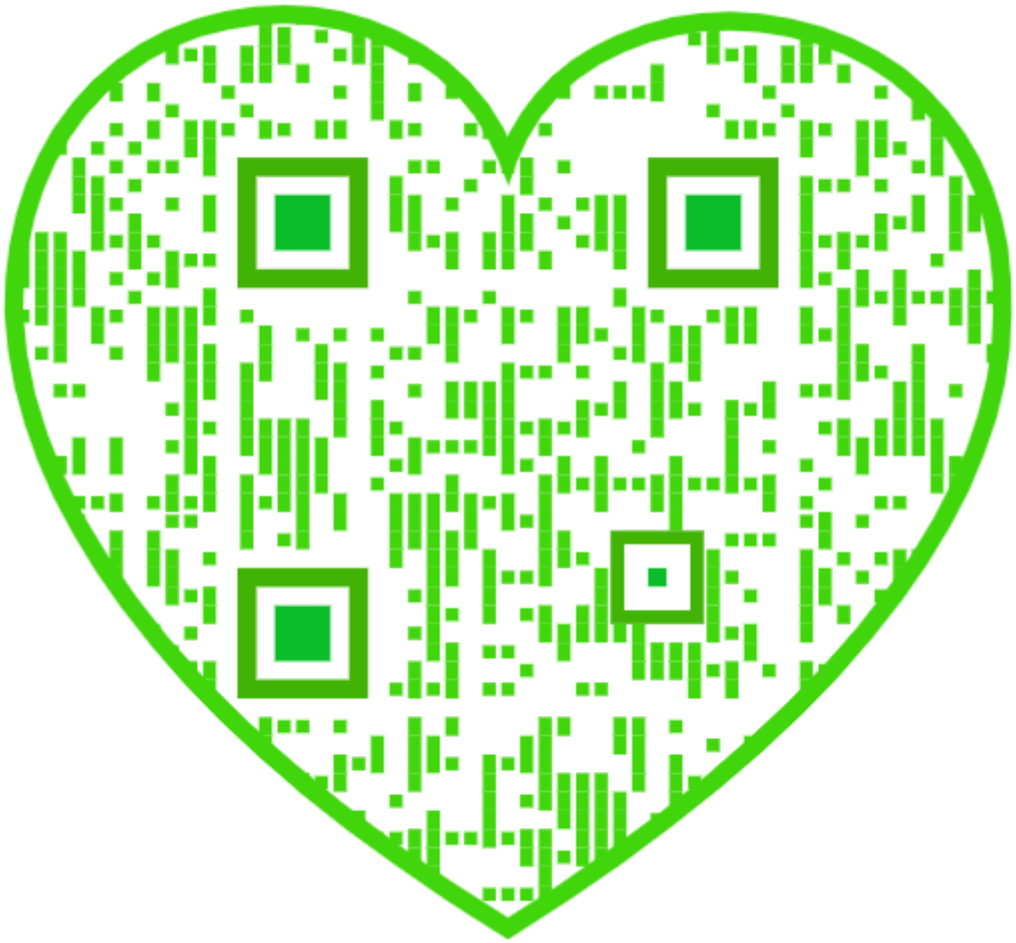

MISCELLANEOUS.

[Reported expressly for the Scientific American.]

Lectures on Chemistry.---No. 3.

[An abstract of a Lecture on Chemical Affinity, delivered before the Mechanics' Institute, at Cincinnati, Ohio, by Prof. Chas. W. Wright.]

Chemical affinity is the attraction of the particles of different kinds of matter for each other, which is exhibited when the particles are in apparent contact only, and the manifestation of it is attended with the evolution of heat, electricity, and sometimes light, together with some one of the following changes, viz., of form, volume, color, density, or chemical properties.

Solution differs from chemical affinity in taking place between bodies possessing similar properties, whereas bodies are more disposed to combine chemically with each other the more unlike their properties. Thus, ether and alcohol dissolve the essential oils, as that of lavender, rosemary, &c., but acids and bases combine, forming a salt, which differ as much from their components, as they differ in chemical properties from each other.

Cohesion is exhibited when two pieces of iron are welded together—their properties are not changed in the least by the operation. The force that binds brick and mortar together, from its taking place between different kinds of matter, without changing the properties of the bodies concerned in the least, is termed "adhesion;" it is probably a modification of cohesion.

The Attraction of Gravitation is exerted at all distances, however great, and therein differs from chemical attraction, which is manifested only at insensible distances, or when the particles of matter are in apparent contact, and has no power in causing bodies to approach each other which are not in contact.

The circumstances which promote chemical action are, first, the fluid state:—in the fluid state the cohesive force is less, and there is a mobility of the particles of matter that allows of their juxtaposition. Thus, when carbonate of soda and tartaric acid are brought together in a dry state, there is no chemical decomposition, but the moment they are dissolved in water there is a brisk effervesence, from the escape of carbonic acid, and tartarate of soda is formed. An experiment of this kind is made in the preparation of extemporaneous soda water and in the making of soda biscuit. In fact, in almost all cases of chemical action, one or both of the bodies concerned must be in the fluid state. Of the three physical forms of matter, namely, the solid, the liquid, and the gaseous,—the liquid is the most favorable to the display of chemical affinity.

2nd. Certain allotropic states,—Chlorine, when prepared in the dark, and excluded from the action of the sun's rays, has little affinity for other bodies, and will not bleach; but, when exposed to the light for a certain time, it becomes one of the most active substances in chemistry. When one body is in the act of being liberated from another it is more active than when it has existed in a free state for a certain period. This is seen in the union of nitrogen and oxygen, in the formation of nitric acid. These bodies have no disposition to combine when mingled in the gaseous form, but when nitrogen is in the act of being liberated from decomposing organic matter, they readily enter into combination, and in this way all of the nitre that is found in nature is formed, with the exception of a small amount formed by the atmospheric electricity. The term "nascent" was formerly used to express this active state of nitrogen.

3rd. Heat—Heat favors chemical action by overcoming cohesion and promoting fluidity. Thus, when potash or soda is fused in contact with silicic acid, of which we have an example of the latter substance in common sand, which is really an insoluble acid, they unite and form glass. Heat, however, does not always bring about chemical action by overcoming cohesion, as when hydrogen and oxygen gases, in which there is no cohesion, are made to combine by it.

4th. Electricity—This is instanced when hydrogen and oxygen gases are exploded by the electric spark.

5th. Light—When chlorine and hydrogen gases are mingled and exposed to the direct rays of the sun, they unite with explosive violence, but they may be kept any length of time without combining, if excluded from the light.

6th. Catalysis—Thus, when a strip of platinum is introduced into a mixture of oxygen and hydrogen, its presence causes them to combine without undergoing the slightest change itself. There are many examples of this contact action in chemistry, they are, however, wholly inexplicable.

Circumstances which retard chemical action—These are, 1st. Cold—The absence of heat, by favoring cohesion, and converting liquids into solids, arrests chemical action. We have examples of this in the consolidation of the water which exists in organic matter, as that of flesh for instance, which, when frozen, never putrefies, and can be kept any length of time. The mastodon which was found some years ago, near the North Pole, is a notable example of the influence of cold in retarding chemical action. This animal, which belonged to a former period of the earth's history, remained for ages entombed in a huge mass of ice, and when first found the flesh was but little decayed, putrefactive decomposition having been prevented by the intense cold of the region in which it was found.

2nd. Dryness—By preventing the mobility of the particles of matter, dryness, or the absence of the fluid state, is opposed to chemical action. This fact is turned to practical account in the preservation of meats, fruit, &c., by depriving them of the greater portion of the water which they contain.

3rd. Elasticity, or the Gaseous State—Elasticity, or the gaseous state, is not so favorable to chemical action as the fluid form, the particles of matter being too widely separared to act freely upon one another.

Chemical Affinity under Extremes of Temperature—Geology teaches us that the earth, at an early period, was in a state of igneous fusion, and that all the water surrounding it existed in the atmosphere as transparent vapor, consequently many substances that are now found upon the surface of the earth had no existence then. All that class of salts called the nitrates, of which common nitre or saltpetre is an example, were not then formed, as they are all decomposed at a red heat. Of the classes of phosphates, the monobasic are the only ones that could have existed, as all of the others are decomposed by an elevated temperature, and the same remarks will apply to many other salts, and to all organic compounds. Even at the present temperature there are substances in certain parts of the earth, which do not exist in others. Thus it it was observed by Prof. Horsford, that ozone was destroyed by a temperature of 140°, and as a temperature as high as that frequently exists in some parts of Australia, according to Gould, ozone in such localities must necessarily be destroyed. Epidemic diseases may thus have their origin in the developement of new compounds, from time to time, in the atmosphere. In the glacial ages of the world, almost all of the water upon the surface of the earth existed only in the solid state.

M. Petin's Balloon Ascension.

M. Petin, the French aeronaut, made an ascension from New Orleans on Saturday, Dec. 25th, 1852, with three companions. Mons. Petin says that he attained the great elevation of twenty thousand feet, at which height the pressure on the lungs was so great that it was with great difficulty that they could speak. During the ascent he encountered no less than six different currents of air, that from east to west being the strongest, but that at no time did he find any difficulty in directing the course of his frail bark at will. It was the intention of the navigator to have made a landing on the coast of Florida, but upon throwing over a bag of ballast for the purpose of lightening his car, the hook of the bag caught upon some of the rigging attached to the balloon, below and out of his reach, thus rendering the descent into the waters of Lake Borgne unavoidable. The point at which they struck the water was near a hundred miles from the city, which space had been traversed in less than one hour. Upon touching the water, the car, which was heavily ballasted, sank immediately, immersing the voyagers in the water, but with presence of mind they clung to the fastenings of the balloon, until the car having discharged itself of its contents, rose bottom upwards, when they seated themselves upon the bottom and there remained until rescued from their perilous position, after being twenty-five minutes in the water, by the steamboat Alabama.

Powder Mill Explosion.

A dreadful accident of the above description occurred on the 7th inst., at Acton, Mass., by which several workmen were blown to pieces. The locality is known as Pratt's Powder Mills, and the manufacture is carried on in several detached buildings situated at a small distance from each other.

Some workmen in the Kernel-house—the fifth building from the main road and from the dwelling house—were employed in work upon a cylinder, when, doubtless, (for no one is left to tell the tale), a spark from a chisel falling upon the combustible material, an awful explosion took place, instantly killing the men, whose names were Hudson, Balcombe, and Hanscom, two of whom were married and leave families. The Kernel-house is usually considered the most dangerous of the several houses, and it contained, at this time, as commonly, a considerable amount of powder. The occurrence of this tragedy was, of course, instantaneous, and its consequences quite inconceivable to those who have never witnessed a scene of this description.

Next the kernel-house was on the west side a mixing house, and this quite near; the explosive force forming a vacuum, the sides of the mixing house from the pressure of the air inside were instantly driven out, and the atmosphere, full of fire and cinders entering at an interval of some three seconds, as it is said, this house also exploded. The press-house (as it is called) is placed further off from the kernel-house than the last named, toward the east, and this distance doubtless saved the powder in it from exploding, though the boarding is mostly forced from its sides, and it is in fact a nearly complete wreck.

Of the kernel-house it may be said, it is swept absolutely clean off from the very foundation; the water dam, timbers, and all the machinery scattered to the four quarters of Heaven. The meadow adjoining has the appearance of being thickly sown over with fragments of boards and pieces of timber, while large portions of the roof lay in masses. On the top of the range of hills several large pieces of timber were carried, and countless smaller bits. The mixing house is not so utterly and entirely dispersed, but its timber and machinery (or what is left of it) lies a heap of smoking and blackened ruins. All the remains of these are as completely blackened over by the powder (not charred) as if the process had been effected by the brush of some diligent painter. Words cannot convey a faint impression of the scene of this fearful tragedy. In the workmen's dwellings near the mills the force of the concussion was very great. The window-glass was broken, the furniture shaken, and persons who were near thrown over. Some part of a chimney at the distance of half a mile was thrown off, and in fact at several miles distance the shock was very perceptible.

Georgia Central Railroad.

The Central Railroad of Georgia has been very prosperous during the past year, the aggregate earnings having been $945,508 28—leaving, after all expenses paid, a net profit of $507,625 78; the increase of gross receipts over those of the previous year, are $197,300 42. Out of the above a dividend of $139,858 has been declared for the past year. The locomotives belonging to the company amount to 46, of which number nine are new, twenty-eight are in good order, and in constant service, four are in the shop for alterations and repairs, and five are condemned. It is recommended that, for the ensuing year, fourteen additional engines be purchased, and that six passenger and one hundred burthen cars be constructed. Some damage was done by the late freshet, but not to such an extent as was apprehended. The light T rail now laid down it is proposed to supersede by a heavier article of the same kind.

Patent Matters in Congress.

Russia Sheet Iron—A memorial has been presented to the Senate, by B. F. Gould, of Conn., alleging that he has discovered the means of manufacturing American fine sheet-iron, fully equal to the best Russia sheet-iron, and praying for the patronage and protection of the Government; which was referred to the Committee of Finance.

Ether Controversy.—A memorial has been presented to the Senate, by the heirs and friends of Dr. Horace Wells, of Hartford, Ct., for compensation, arising from the discovery of anæsthetic agents in Surgery, by Dr. H. Wells. On the presentation of this petition it elicited a debate of considerable length, wherein it came out that, at the last session of Congress, the matter was referred to a select committee of the House. The majority made a report in favor of Dr. Morton's claims, and the minority against them. No testimony was taken in favor of Dr. Wells' claims. The reports were not presented, but somehow the favorable one was obtained by Dr. Morton, who got it published, The whole case will now undergo a thorough investigation. We hope that every item of testimony on behalf of all the claimants,—viz., Dr. Jackson, Mr. Morton, and Dr. Wells' heirs, will be presented, and weighed with the strictest impartiality.

Silk Worms.

The breeding of silk-worms is becoming an important branch of industry in Germany; and is so in the northern as well as the southern parts, though the general impression is that silk worms cannot thrive in a northern temperature. The first attempts to establish this branch of industry in the north were made by French Protestant refugees in the District of Wurtzburg, in 1594, and they were encouraged by the Prussian Sovereigns. In the middle of the seventh century, the ramparts of Petz and the environs of Frankfort on the Oder, were planted with mulberry trees, and in the following century Frederick the Great caused plantations to be made at Cœpnik, Potsdam, and in the immediate vicinity of Berlin. Since 1821 the production of silk has become considerable, not only in Prussia, but in the other States of the Zollverein; the annual production is at present several thousand pounds. In quality it is remarkably white, and finer than that in the southern countries; and Berlin manufacturers say that if enough of it could be obtained, they would not apply to the producers of Lombardy.

From Berlin and Potsdam the cultivation of mulberry trees gradually extended to Silesia and Hanover. It is schoolmasters who chiefly occupy themselves with it—one of their body having in the eighteenth century commenced it as a means of adding to his income; and some of these persons now gain from 20 to 80 thalers annually. Several of the German Governments encourage the productions of silk by granting premiums, and causing societies of patronage to be formed. A short time ago, the Minister of Commerce recommended that the sides of all the railways should be planted with mulberry trees. The King of Wurtemberg has caused the French translation of the Chinese treatise on the breeding of silkworms to be translated into German, and to be extensively circulated at Dresden.

In the Grand Duchy of Baden the roads and the sides of the railways have been planted with mulberry trees, and in the village of Ilgen, near Heidelberg, the breeding of worms has been carried on, during the last twelve years, on an extensive scale. Austria, on its part, is sparing no pains to increase its production, which already amounts to about 100,000,000f. annually—one half coming from Lombardy alone. On the military frontier of Turkey a garden of mulberry trees has been established in every village, and the military colonists are encouraged to extend the cultivation. At Prague the fosses of the fortifications have been planted with mulberry trees, and orders have been given that such trees shall also be planted by the side of all the railways in the monarchy.

The average price of gas in England is $1,20 per thousand cubic feet; this is less by $2,60 than it is in New York City. All the working people there burn it.

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Machinery and Tools as they are.---Printing Presses.

(Continued from page 131)

The gigantic presses we have last described are only employed by a few of the leading journals, whose circulation is very large, —the majority of printers still using the ordinary power-presses, except for fine book-work, when Adam's press is generally employed here, but previously to giving a description of this latter kind we will take a cursory glance at the other varieties of cylindrical presses. In the type-cylinder machine it is evident that the columns of type, strictly speaking, form the sides of a polygon, but the breadth of the columns is so small, compared with the diameter of the cylinder, that their surfaces depart very little from the regular cylindrical form, the diameter of the type drum being 4½ feet, and sometimes over 5 feet, but if this principle were applied to small presses, the type-drum being made of proportionate diameter, and having only one cylinder or perhaps two, for the paper, it will be apparent that the polygonal sides formed by the type would be a serious detriment to the operation. In his last patent, Applegath proposes to remedy this defect by using two type cylinders, so arranged that each will carry only one half of the number of columns required. The columns being placed on either type cylinder, alternately, so that the paper first comes in contact with one type-cylinder, and having been impressed by the columns fixed upon it, then encounters the type upon the other cylinder. Such an arrangement would allow the type drums to be very much reduced in size, and by making the type of a taper form a still further reduction might be made. Taking as an instance a case in which the circumference of the cylinders was 200 inches, this modification would allow the circumference to be reduced to 70 inches, and with taper type the cylinder need not be more in circumference than the size of the sheet of paper when measured across the columns. The proposition of using taper type is somewhat analogous to a plan proposed as far back as 1792.

A new method for printing both sides of the sheet, when the paper is once fed to the press, is also indicated in the same patent, but this latter operation, which, by-the-way, is not entirely original, is not of so much importance as many are inclined to suppose, for an equivalent advantage can be gained by an arrangement well known to printers. For this purpose it is only necessary to make the press sufficiently wide to print a sheet large enough to make two copies, when, if the form for both sides be placed on the type cylinder, and a sheet of paper supplied, it will issue from the press having the two halves of the paper printed on it. Now let it be passed through the press again, so that the other side may be similarly printed, and it will be seen that two copies are obtained by a process as quick as that just mentioned, and which is much more simple. The use of revolving type cylinders has been adopted by some printers who carry on business in this city, for book-work, the press employed being in some respects similar to that used for newspapers. It is adapted to print on both sides during the passage of the paper from the hands of the pressman to its egress by the fly-frame, and the following is the manner of operating:—Two type-drums are employed, each having a paper or tympan cylinder, directly over it, so that after the sheet has received an impression on one side, it is released and allowed to fold around the other cylinder in such a manner that the unimpressed side is presented to the type. This press appears well adapted for printing periodicals or cheap books, and is employed for stereotype printing.

The above-mentioned machines are all, however, of very recent date, and by the far greater proportion of printers the Napier press is still employed. It differs greatly from those already described, in having a flat type-bed which moves forth and back horizontally, the paper being folded around a revolving cylinder, which, in its circuit, presses the paper against the form. Such was the leading principle of nearly all the power-presses until within the last few years. Their chief defect lies in the necessity of reversing twice the direction in which the bed is moved for each impression, the magnitude of this evil will be understood by instancing a press of the largest size in which the weight of the bed and type amounted to a ton, which mass had to travel a distance of 88 inches in each direction, it was found that so great a weight could not be driven along such a space with safety at a greater rate than about 45 strokes per minute, which limited its maximum producing power to 5,000 sheets per hour. The momentum of this heavy mass is counteracted by powerful springs, which, at the termination of the stroke either way, receive the shock imparted by the moving bed, and by means of their recoil, dimish the resistance to the retrograde motion. When a bed is to be moved at so high a velocity, it will be easily conceived that the friction would be enormous were it to move on a plane surface, but by causing it to rest on rollers the friction is greatly diminished. There are many variations in minor points among the different species of this description of press, but in the leading principles they are all similar, although some are adapted for rapid, and others for neat typography. There is, however, one ingenious contrivance, common to them all, namely, that by which the paper is pulled forward at the proper time, then grasped by the fingers of the cylinder until the impression having been imparted, they relax their hold, and the paper is carried by the tapes to the fly frame.

There are other kinds of power-presses very different in construction to those just mentioned, and which bear a greater resemblance to the hand-press, the most prominent of these is the press manufactured by Adams, of Boston, and which has acquired a high reputation amongst that class of printers who aim rather at excellence than rapidity. It differs from its prototype, the hand-press, in employing a bed which moves up to give an impression, whilst the platen remains stationary, which plan is the reverse of that adopted for the hand-press. The paper having been supplied by the pressman, it is, by means of fingers or clips, carried under the platen; here it pauses, receives the impression, and is carried by tapes for some distance horizontally, when it rises, in order to reach the fly-frame, which operates in the usual manner; the inking process is effected by giving the bed a horizontal motion in addition to its vertical movement. The performance of the larger machines of this description we believe will amount to 600 copies per hour, which appears a small number when compared with the 20,000 copies of the revolving type press, but our readers must recollect that whilst the one is intended for rapidity, the other is intended for excellence.

(To be Continued.)

Intelligent Mechanics.

Messrs. Editors—In your paper of the 25th ult., you complain of the want of a sufficient number of "intelligent mechanics" in our country to fill the numerous openings constantly occurring; you say, "we have frequent applications for practical intelligent mechanics who can superintend their business, and we know from experience how difficult it is to obtain them. A gentleman, writing to us some time ago for a machinist to superintend his foundry and machine shop, said he would give him above $2,000 per annum, but would be willing to give more could he get the proper person, a gentleman, with whom he could associate as a friend. The elevation of our working men is one object about which we are solicitous."

As I have long been a reader and subscriber of your valuable paper, of course I am not ignorant of some of the advantages derived by a mechanic who regularly reads it, and I must own my surprise at your complaint of a want of intelligent mechanics; my means of knowing the wants of the country, in this respect, I do not compare with your means of that knowledge, but from some experience in this community, and taking *it* as an index of the matter, I supposed no demand for intelligent machinists could be made that could not be promptly met, if properly made known to our machinists; for here I know them as a class to be really intelligent men, and as we have supplied, satisfactorily, many wants, for managers, from all parts of the country, and believe we can furnish several at present, I wish to inquire of you whether you have thought of this "village," where your paper has very many readers?" and if you have failed in obtaining an intelligent machinist, a fit companion for a gentleman, *here*, and will communicate the fact to me, I can name one to you who can satisfactorily answer your call, and he will do it, if the location is one where he would not risk too much by going.

Chas. N. Brock,
No. 30 North 10th st., Philadelphia, Pa.

[It would be a sad thing, indeed, for our country, if every city did not contain many very intelligent mechanics, and every village, too, in proportion to its population, but we do assert that, in proportion to their number, our mechanics do not possess the amount of intelligence they should possess, and for this reason they do not exercise a public influence in proportion to their number and real usefulness. The reason why it is difficult to obtain competent men, with the requisite qualifications, is, they are generally prized and can find situations at any time. We had a letter last week, from a mechanic and artist in Boston, stating that he never was out of a situation for one hour in twenty years, and that he always had the highest wages paid him; this he attributed to the reading and study of good works and to a taste for experimental philosophy. Mr. Brock will find one of the complaints to which we referred on page 277, Vol. 6, Scientific American, and the advertisement of the same gentleman on page 279, same volume.

At one time the professions of medicine and surgery were ranked with that of the barber; but education—a high education—has raised the Doctors of the healing art, to a position (as the world judges) far above that of the mechanic. This should not be. Our aim is to elevate, and for the statements which we made in the letter referred to by Mr. Brock, we have already received the thanks of a number of mechanics for uttering them so freely. We are, perhaps, personally acquainted with more mechanics, in different parts of our country, than any other person, and we cannot draw back a single expression we have made. The intelligent (what we consider intelligent) are the select few; we shall labor to make them the *select many*. It has, no doubt, come under the observation of Mr. Brock, as it has under ours, how that one shop in a place will have an average range of intelligent mechanics far above another in the same place, as if like qualities drew together kindred minds. We thank him for writing frankly on this subject; and gentlemen in various parts of the country—manufacturers and others, will be pleased to take notice of his statements in reference to intelligent mechanics.

Ice House Management.

This is a matter of no small importance yet how often do we see it treated, not only with indifference but upon the very worst principles possible to ensure its preservation; not one ice house in fifty is constructed upon the correct principles—not one in the same number is managed correctly. When we consider that damp and heat are the two great agents of thawing, it should be our endeavor to counteract these by every means in our power. To effect this ventilation must be had resource to, and non-conducting materials employed in the erection. Of materials, we may observe that stone is of all others the worst timber and brick are the best. The usual practice of sinking ice houses to a great depth under the surface is bad; indeed, it has only one redeeming property, which is the convenience of filling from the top. Its advantages are, the difficulty of admitting sufficient ventilation to correct the dampness, which, build them as we may, is sure to exist in underground houses, the conduction of heat from the surrounding soil, and the difficulty of effecting sufficient drainage; these very far overbalance the advantages thus offered. Why are the majority of ice houses and most cellars during winter so much warmer than the surrounding atmosphere? Is it not from the heat conducted through their walls from the surrounding soil? Earth is a much better conductor of heat than air, or, in other words, it communicates its heat to other bodies coming in contact with it much quicker than that element. Hence the necessity of placing between the earth and the ice some slower conductor of heat, and the slowest conductors we have applicable to the case are timber, charcoal or air; both also resist damp, while stone does not, and, besides, it is a rapid conductor of heat. Water is also a rapid conductor of heat, and instances have been known, where rain water has percolated the roof of an ice house, that the temperature has been raised to sixty degrees. Hence the necessity of keeping such houses perfectly dry, not only at the top but also throughout, by efficient drainage of the melted ice, and by ventilation to correct the dampness in the atmosphere and walls. Indeed, the walls of an ice house, to be in proper condition, should be as dry as those of a dwelling.

The cheapest and best way of constructing an ice house is to make its walls double with a space between them, which should be filled with that excellent non-conductor, "charcoal dust." Where timber is cheapest the house should be boarded inside and out, with the charcoal dust between the walls; where bricks are cheapest they should be used. Stone may be safely used with such a good non-conductor between a double wall. Dry saw-dust is also a good non-conductor, and it can easily be obtained everywhere in our country, but it should not be used unless it is perfectly dry.

New Improvement on the Hydraulic Ram.

William Fields, Jr., of Wilmington, Delaware, has lately invented four improvements in addition to a patent he has already received on the Hydraulic Ram. The improvements are as follows: "a valve and valve-box at or near the end of the drive pipe, next to the spring or dam, opening upwardly and inwardly, which valve keeps in the back action, and prevents the water from escaping in the spring;" these are already patented by said Fields, but he has now invented an air chamber similar to the drive pipe, and nicely attached to this valve-box; this gives great efficiency to the ram, and works with such regularity that it is impossible for the ram to stop as long as it is supplied with water. The next improvement is a brass puppet valve under the air chamber, which rises and falls a certain distance; this valve has circular holes all around it, so as to let the water in the air chamber, and excels the hinge valve in durability, and no gravel can prevent it from closing. The third improvement is a horizontal waste-water valve with a piston; this valve is constantly kept open, except when the momentum of the water closes it, then, when the water re-acts, a spiral spring forces it open, which is a very simple and durable plan. The valve is so arranged that not anything can stop its action. The fourth improvement is precisely the same kind of a valve as the waste-water valve and box, but is placed immediately in the rear of the air chamber, attached to a branch pipe suitable for one, two, or more valves of the same kind. Those valves are to take up a good portion of the waste water after it has escaped from the waste-water valve. This waste-water valve and the rear valves, being two or three inches under the water, more or less, when the water is escaping from the waste water valve, the powerful suction of the water into the ram from the others takes the greater part of the waste water in, and the greater the fall and length of the driver pipe, the more is taken in.

Preserved Birds, Mammels, Reptiles, &c.

We have received a letter from A. H. & E. W. Winans, taxidermists and collectors in the varous branches of natural history, Warsaw, Ill., which states that they keep a constant supply of beautiful mounted and stuffed specimens of the birds, mammels, and reptiles of North America, and will furnish orders for public or private collections. They will undertake to fill orders for any or all of the birds of the Upper Mississippi, and do so as fast as they obtain the specimens. We direct attention to the profession of Messrs. Winans, because we think there are many of our readers who have a taste for objects of natural history, and who would be glad to get some, but know not where to obtain them.

We see it stated, in an exchange, that the laborers in England are worse paid and subsisted than they were two centuries ago. This is not true; they are better paid and have more comforts now than they ever had.

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NEW INVENTIONS.

Improved Boot Crimp.

William Faus, of Buckhorn, Pa., has taken measures to secure a patent for improvements in the above. These improvements consist in the employment of two sets of clamps, one set of a double wedge or conical shape, for stretching the corners of the leather, when the boot is fixed for crimping, and the other for stretching the entire surface. The operation of crimping is performed by a removable lever, which is likewise an improvement, as by the ordinary plan this lever is stationary, so that the boot, after being partly crimped or shaped, must be taken off and finished by hand. In this improved apparatus the crimping lever is attached to the table by a pin, so that it can be removed after the crimping has been done, and another substituted in its place. The clamps are made to work in slots cut through the above-named lever, by means of set screws, which operate exclusively on their corresponding set of clamps. All, therefore, that is required to be done for crimping the boot is to attach the leather to the clamps and press the lever between a pair of wooden jaws four or five times, moving the screws and clamps outwards as the lever is operated.

Improved Car Wheel.

In the process of casting railway wheels, they are liable to break from the contraction of the metal in cooling, to obviate this evil an improvement has been made by John Eaton, of Brownsville, N. Y., who has taken measures to secure a patent. For this purpose the space between the centre or hub of the wheel and its periphery is formed in a series of spiral curves, which transversely take a zig-zag shape, so that the wheels are prevented from breaking as they contract in cooling, in consequence ot the curves giving way or yielding both longitudinally and transversely. To prevent any excess of metal at the periphery, so that the thickness may be nearly uniform throughout, provision is made for a hollow truck or recess, extending all around the wheel and connected to the ends of the spiral curves, which forms, likewise, part of the casting.

Improved Bread Cutter.

A machine of the above description has been lately invented by William R. Goulding, of New York City, who has taken measures to secure a patent. It consists simply of a knife that may be adjusted to suit any thickness of bread that may be required to be cut, and of a guide bar connected to it by means of screws. These screws, which are for the purpose of adjusting the knife to the required width for cutting the slice of bread, are fastened to the ends, and pass through the ears or projections of the guide bar, which are tapped to receive them. In order to obtain the requisite width, the screws are turned in a corresponding direction (to right or left), and the thickness of the slice of bread is varied accordingly.

Improved Carriage Hub.

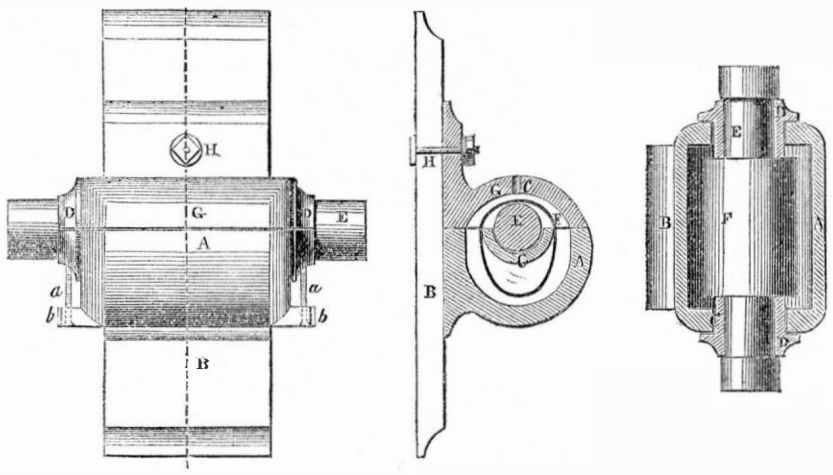
In order to secure the axle more effectually than has hitherto been done, on the wheel, a new improvement has been invented by John Olles, of Philadelphia, who has taken measures to secure a patent. For this purpose two tubes, one inside the other, are let into the eye of the hub, and the end of the axle is made of a suitable shape to play freely within the inner one, but is prevented from working out by means of a collar and screw box, which are fitted on to the outer tube. The objects effected by this arrangement are, first, that of shifting the bearing of the axle to all parts of the inner circumference of the intermediate casing, which is accordingly made movable, and in the second place that of securing the wheel firmly on the axle as well as preventing the oil from flowing any where except to that part of the axle inside the hub.

Improved Wrench.

Measures to secure a patent for the above have been taken by George B. Read, of New York City. All mechanics have had too much practical experience of the difficulty of keeping adjustable wrenches properly fixed, so that they may not slip around the nut instead of firmly grasping it. The inventor has hit upon a happy device to attain this desideratum by the following plan. One jaw which is attached to the wrench stock by a pivot has a recess through it, in which slides the shank of the other jaw, which is therefore adjustable, and its shank is provided with a rack into which catches a pawl attached to the stock and held in position by a spring. By this construction, as the handle ot the wrench is turned, the two jaws are forced against the sides of the nut, more especially grasping the outer corners of it, the failure to do which is the cause of the slipping so common in other wrenches.

IMPROVEMENTS IN JOURNAL BOXES.

Figure 1. Figure 2. Figure 3.



The annexed engravings are views of an improvement in Journal Boxes, invented by George Pierce, of Norwich, Conn., who has taken measures to secure a patent for the same.

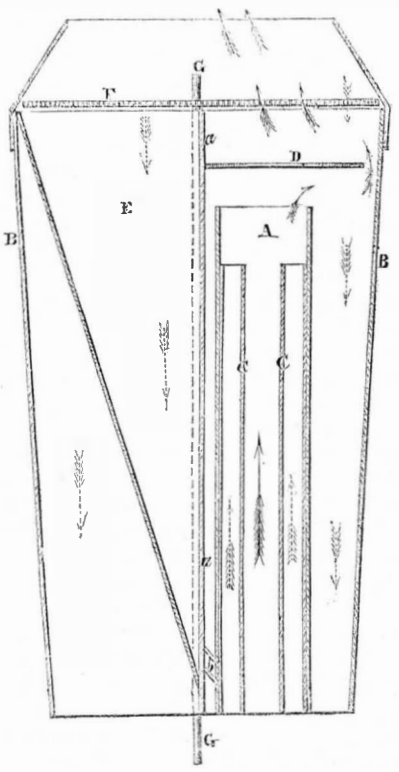
Figure 1 is an outside view of the journal box; figure 2 is a transverse vertical section of fig. 1, taken through the middle, as shown by the dotted lines. Fig. 3 is a plan view, with the cap removed, and the shaft placed upright. The same letters refer to like parts.

A is an oil reservoir of the form of a half cylinder. It is attached to or cast along with the stock, B. C is the journal box placed within the reservoir. The journal box is of the shape of a half cylinder, and is provided with flanges, D—one on each end—which fit over the sides of the oil reservoir, and prevent the escape of oil, as shown particularly in fig. 3. The journal box is secured permanently in the reservoir by means of the screws, *a a*, which pass through openings in the lugs, *b b*, on the outer sides of the reservoir and into the under parts of the flanges, D. E is the journal fitted in the box, C, and F is a conductor of cotton or other suitable material, which passes around the journal and box and into the fountain, A: the two ends being united, if desired, by making it a continuous belt, as shown in fig. 2. G is a cap which fits on the upper part of the reservoir, A, and over the journal, E. This cap is secured to the stock, B, by a bolt, H. This cap has an aperture, *c*, through which the reservoir is supplied with oil. The conductor wick, F, conveys the oil over the journal. In consequence of box C being placed in the oil reservoir, the oil has a tendency to keep the box in a cool state, and even if the box becomes heated, it will make the oil flow more freely over the journal. The top of the journal box is on a level with the top of the oil reservoir, so that the oil, when the reservoir is full, is as high as the top of the said journal box; the said box, therefore, has its outer surface wholly in contact with oil, thus affording complete lubrication for the journal or bearing of the shaft.

More information may be obtained by letter addressed to the inventor.

Kimball's Spark Arrester.

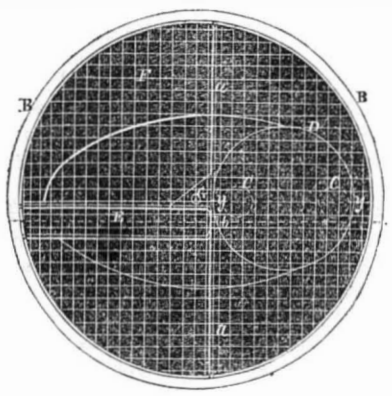
Fig. 1.



The annexed engravings are views of an improvement in Spark Arresters, for locomotives, invented by V. P. and B. Kimball, of Watertown, N. Y., for which a patent was granted on the 5th of last October (1852). The nature of the invention consists in the employment of a revolving fine screen, in combination with a chamber for creating a downward draught, said chamber being connected at its lower end with the smoke-pipe at a point below the upper ends of the exhaust tubes. The screen allows the smoke to pass through it, but prevents the cinders, the most of which fall below upon touching it; those cinders, however, which stick, as is usually the case, in the meshes of the screen, are cleared from the same, while the screen in its revolution is passing over the chamber mentioned, which has the downward draught. The downward draught is to clear the screen, and this allows such fine wire gauze to be used as will, it is believed, prevent all sparks passing up through it.

Figure 1 is a vertical section, and fig. 2 is a horizontal section,—fig. 1 being taken through the dotted lines, fig. 2. The same letters refer to like parts.

Fig. 2.



A represents the upper part of the smoke pipe; it passes into the main funnel, B. C C are exhaust tubes, which pass upwards in the smoke-pipe, and terminate a short distance below its top. D is a shield placed over the smoke pipe a short distance above it; this shield is attached to a vertical partition, *a*, in the centre ot the funnel. E is a chamber, the top of which extends from the partition, *a*, to the side of the funnel, B. This chamber narrows gradually to the tube, *b*, which tube communicates with the smoke-pipe, A, below the ops of the exhaust tubes, C C. F is a circular-shaped screen made of wire-cloth and placed in the upper part, on a vertical shaft, G, which passes through the centre of the funnel, B. The horizontal view shows the screen. Rotary motion is communicated to shaft, G, by gearing from the engine, which consequently rotates the screen, F, and as the smoke and cinders pass up the pipe, A, as shown by the arrows, and through the screen, F; the cinders, however, strike against the screen and fall down to the bottom of B, and the shield, D, prevents them from returning into the smoke-pipe. Some cinders generally adhere to the screen, and, in time, it becomes clogged and obstructs the draught; to obviate this difficulty, the chamber, E, is employed, and as the lower end of it connects with the smoke-pipe, A, at a point below the exhaust tubes, C C, (these tubes convey the exhaust steam into the funnel and are the grand sources of rapid steam generation), a downward draught is created in said chamber, E, and by this means all the cinders which adhere to screen F when it is revolved over said chamber, are drawn downwards by the suction of the air from above, by the blast of the exhaust pipes.—The object and operation of this improvement is so simple that every person will comprehend it and see into its utility.

More information may be obtained by letter addressed to the patentees.

Cotton Scraper and Cultivator.

A combination of these two agricultural implements has been lately invented by J. W. Thomson, of Jackson, Tenn., who has taken measures to secure a patent. The cultivator, in this instance, is attached behind to the standard of the scraper by means of a staple or any other suitable fastening, the beam and handles being dispensed with as unnecessary. The advantage obtained by this combination of two distinct implements is the resulting economy of labor, as the two operations of scraping and plowing the ground are performed together, the teeth of the cultivator taking into the ground and cutting it loose as fast as the scraper clears it off.

A Magnificent Water Power.

It appears by the following paragraph from the Lockport Courier, that an attempt is about to be made to put to practical use the immense water power of Niagara Falls:—

"We are informed that an Eastern company has been organized for the purpose of constructing a canal at Niagara Falls. The canal is to commence about half a mile above the falls, and pass directly through the village at the falls, and empty, of course, into the river below the cataract. The Porters have made liberal donations to the enterprise, and there is no doubt in the opinion of our informant, but that the process will be successfully carried out."

[There can be no doubt but the water power of Niagara is sufficient to drive all the machinery in the world, and some years ago we spoke of its application for factory purposes on a large scale, by cutting a canal from above the falls, as has been done at the Cohoes, on the Mohawk. There are a number of mills at Niagara now, and for the manufacture of wooden ware, for grist mills, and any other kind of manufacturing business to supply the interior of our north and west States, or for working up raw materials from the north or west it may be successful, but to make cotton goods when the raw material has to come from such a distance, and the goods to be again transported to a market at a great distance, it would not be a profitable speculation in our opinion. Steam power near New York City is cheaper than water power at Niagara for many kinds of manufacturing purposes, and cotton is one of them. The reason we give for this assertion is, that the transport of the raw cotton up to the interior and of the goods back again to our market, where all the cotton goods are sold, more than counterbalances the expense of steam as compared with water power. It is our opinion that cotton factories erected near New York City, and using steam power, would make better dividends than those erected over one hundred miles in the interior which employ water power.

The value ot land in the centre of the city of London, is £400,000 per acre.

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Scientific American

NEW-YORK, JANUARY 15, 1853.

Extension of a Patent, and the Granting of a New Patent.

We do not know when we were more pained by an exhibition of bad administrative qualities than in reading the debate in the Senate on the 4th inst., respecting the bill for the relief of Hiram Moore and John Hascall, for extending their patent for a grain reaper, and granting a new patent for improvements on said machine. In 1836 these two men took out a patent for a grain reaper, which patent, by standard law expired in 1850. Well, they have got a bill introduced into the Senate to extend their patent for 14 years from the 27th June, 1850, and to it is tacked the following clause, "together with the improvements invented by them, or either of them in perfecting said machine, or any part thereof, from the date of the original patent, to the day from which the same is hereby renewed and extended." It is indeed a strange thing that such a bill in face of standing laws, got into the Senate, and should have been called up and advocated by Senator Cass, with all his experience as a statesman and lawyer. It is evident that he is either not acquainted with the Patent Laws, or that he never read the bill, an error on his part in both respects. The patent laws demand that a model, drawings, a specification, petition, oath, and certain fees, should be presented to the Patent Office before any patent for a new improvement can be granted. The Patent Office Department is organized for this purpose; it is the agency of government to perform such duties, and patents for improvements are granted at all times. Why did not Messrs. Moore and Hascall submit their improvements to the Patent Office, and why did the Committee on Patents in the Senate not send them at once to the proper quarter, where alleged improvements are examined, and where patents are granted? There must be something essentially wrong about the whole transaction. Senator Walker detected the wrong, and appeared to be the only Senator who spoke, that had studied and thoroughly understood the question. He said, "sir, I believe it may be safely said that there never has been such a proposition before the American Congress, if there ever was such a proposition before any other legislative body in the world. Is this a bill simply extending benefits to Moore and Hascall? Not at all, but the effect of it, in my opinion will be, and I have come to the conclusion, after an examination of it in connection with the patent laws, to give Moore and Hascall a monopoly of everything that has been discovered, invented, or constructed, in the way of improvement since the date of the original patent." This is a fact, and let it ring far and wide, so that our people may see the dangerous influences, which are at work in Washington.—Why did not these patentees get their patent extended in the usual way, at the Patent Office, and why did they not apply in the usual way; has there been a plot to obtain a renewal of the patent, and a new patent combined, by surreptitious action? It looks like it.—Those Senators whose attention has been directed to the real question (not the extension of the old patent,) but the dangerous grant of a new patent, we hope will throw out all the amendments. The improvements claimed by Moore and Hascall may not be their invention at all. How does Senator Cass know. The improvements claimed may belong to McCormick or Hussey, and may be covered by their patents. Unless Moore and Hascall were afraid of something like this, they would go like honest inventors and make application in the usual way, and submit their alleged improvements for examination. This is the way provided for by law, and we do not see why the Senate, who made the law, should override it. The majority will not, we are sure, disgrace the Senate by granting such a bill. We do not say a word against the *legal* extension of a patent, but to grant this one in this manner would be a violation of the existing statute, which provides for the extension of a patent for *seven years*, when the inventors have not been sufficiently remunerated. We are believers in sticking to the law in all cases. Moore and Hascall have not complied with its provisions, and for the Senate to grant their petition would be like paying them a premium for contemning the very laws made by the Senate itself; such an act should not be so much as named in the Senate.

Critical Dissertation on Steam, Air, and Gas Engines.

In the strictest sense of the term the fuel may be denominated the "prime motive power" of an engine, for upon the quantity used the whole economy of steam power depends. It is not the mere price of fuel, it might be ten times dearer or ten times cheaper than it is and yet fail to confer any benefit upon man. Thus for example, if 200 tons of one kind of coal could raise steam enough to drive the Pacific steamship across the Atlantic, it would be cheaper to pay $40 per ton for it than $8 per ton for a kind of coal which would require 1,000 tons to work the engines during one voyage. The quantity of coal used determines the length of steam voyages. The great object in all inventions to improve steam power, or supersede it, should be the developement of force with a saving of fuel; we want something better than the steam engine if we can get it, and it is all sheer nonsense to say that hot air, as a substitute for steam, will save fuel, as is now said about the hot air ship, and yet that ship not sail as fast as a steamship. If the principle does save fuel it should make a ship sail faster. If the reason is asked, why? it is easily given. A steamship requiring 300 tons less coal, and equal to another in every respect, must surely sail faster, at least as fast, and have the advantage of carrying 300 tons more of paying cargo. The greatest care has been exercised, and much ingenuity has been expended on marine engines and boilers, in order to save fuel—the quantity of it—for if it required 2,000 tons of coal to navigate a ship of that tonnage across the Atlantic, there would be no ocean steam navigation.

There are two kinds of steam engines totally distinct in the principles of their operation, the one is the "condensing engine," and the other the "non-condensing"—commonly called the "high pressure." The former allows the steam to escape (after acting on the piston) into a chamber where it meets with a jet of water and is suddenly condensed into its original volume, thus leaving a vacuum for the next jet of steam from the cylinder, and taking away all back pressure from the next stroke of the piston. The non-condensing engine allows the steam to escape into the atmosphere acting against the pressure of the air, which is 15 lbs. on the square inch. The condensing engine economizes fuel because it saves a pressure of 13 lbs. on the square inch (the other 2 lbs. being deducted for the power required to work the air pump,) by forming a vacuum behind the piston by the condensation of the escaping steam in the condenser instead of letting it escape into the atmosphere. For this reason, and owing to the greater safety of low pressure steam, the condensing engine is exclusively employed in steamships. There is one principle, however, in which both engines are alike, we mean the exhaustion of the steam out of the cylinder into a place where the pressure is below that of the steam. Thus if the pressure of the atmosphere was 45 lbs. instead of 15 lbs. on the square inch, a non-condensing engine with a pressure of steam at three atmospheres, (45 lbs.) would not operate at all. If the steam could not be reduced suddenly into water again, then the condensing engine would be out of the question, so that the success of the high pressure steam engine depends on the pressure (15 lbs.,) of the atmosphere, and that of the condensing engine on the quality of the steam, it being suddenly condensable to its original volume by a jet of water. The principle, then, whereby every steam engine is rendered operative, depends upon the medium into which the steam escapes after having acted on the piston; it must be a colder medium than the steam. An engine operated by hot air cannot act upon any other principle; the hot air must be allowed to escape into a colder medium, or it will not operate. For example, supposing an engine to be operated by hot air at 491° is placed in a room having its atmosphere heated to 491°, the hot air engine, if its exhaust ports opened like a high pressure engine into the room, would not operate at all, because the air in the room is of the same tension—the hot air within the cylinder and the hot air without would be in equilibrium—static pressure. How can it be possible, then, for hot air to propel an engine, as has been pretended, and save all the heat of the air. It is a chemical impossibility, and no wonder it baffled Faraday to explain, as was stated in an article copied from a foreign magazine, by a sapient journal in our city. For example, allowing hot air at 491° to be the propelling agent of an engine, and allowing the hot air to have driven the piston to the end of the cylinder, before the said piston can be driven back again, the hot air on one side must be suffered to escape into a condensing, or colder medium, before the hot air applied at the other side of the piston can urge it to the other end of the cylinder to make a full stroke. Well, allowing that the hot air escapes into a series of layers of wire gauze—or a regenerator, as was proposed by Stirling, and mentioned, as he states, in his first patent of 1827, (see London Mechanics Magazine, Vol. 45, for the year 1846, page 563 and 564) it is obvious that just as the wire gauze, takes up the heat of the air, so in proportion as their heat increases, their efficacy as an absorbing medium—condenser, refrigerator, or call it by whatsoever name, is vitiated, and the result of this is, that the back resistance increases, and if the heat of the gauze was allowed to attain to 491°, the engine would not act at all, as would be the case with a steam condenser without an air pump. To pretend that the same heated air can be transferred to wire gauze in a regenerator, and used over and over again, the regenerator acting both as a condenser and boiler is an anomaly. Upon the same principle of saving fuel, every engineer should exhaust his steam into his boiler. Not much fuel, to be sure, would be used, but as little power would be developed. If a certain quantity of hot air can be made to act on a piston, exhaust, give out its heat and take it up again, and so keep a round of action, like one jet of steam making a rotary engine run round for ever, then the same thing can be done with steam, for steam is a gas, as well as air, and comes under the same laws in combination with heat above 212°. The hot air engine cannot act but upon the principle of expansion and contraction, and the steam engine upon the very same principle (evaporation and condensation). The engineer could never make his locomotive fly along the iron track like a whirlwind, but for the absorbing power of the atmosphere, and its cooling effect on the escape of the exhaust steam; also the cooling property of fluid evaporation. If such a law did not exist the boiler would soon become red hot and be rent to pieces, but that all absorbing property for heat exhibited by water, which renders it, as stated in our last article, so superior to hot air, and which is carried off by the steam at a comparatively low temperature, robs the furnace of its energy, makes it safer and more economical to use than hot air, and enables a force to be generated with a rapidity for propelling purposes, far surpassing that of the gases.

To Manufacturers of Machinery.

A subscriber in North Carolina wishes to know where he can get the best machinery for making linseed oil, as he is about to commence its manufacture. We cannot give him the exact information which he wants. It would be well for manufacturers of machinery—all kinds—mills, &c., to advertise in our columns, once at least, in every volume. We are positive that it would put far more than the price of advertising into their pockets, it would save us much trouble, and be of great benefit to many of our readers. Manufacturers and others who use and wish to purchase machinery look to our columns for information. We have no occasion to make these remarks for the purpose of obtaining advertisements.

We do not speak from pecuniary motives, although we admit that advertisements of machines are advantageous to us for the reasons given before, that those who use machinery look to the Scientific American as the source of obtaining information about the same. In this respect we derive a benefit, but much more the manufacturing advertiser, and those who require such information.

We are constantly receiving enquiries from every part of the country concerning the price of various machines and tools, and the address of the manufacturers.

Those manufacturers who make machines for turning, mortising, sawing, tenoning, planing, tongueing, and grooving, etc., etc., who will send us circulars, stating capacity and price of each size will find it for their interest to do so, besides it will render us better able to give our patrons reliable information. Not a day passes but we have enquiries (besides receiving a number of letters), made at the office, for the address of some manufacturer, or to know which machine in some particular branch of business is the best. To answer these incessant enquiries it takes much time, and cannot always be done satisfactorily, whereas, if our manufacturers will send us lists of what they manufacture, we will paste their circulars in a portfolio, and keep them in a conspicuous place for the benefit of such as may be in pursuit of machinery or tools, and no doubt both sellers and purchasers will be benefitted thereby.

The Aeroport or Flying Ship.

Another number of the *Aerial Reporter* has been published by its indefatigable editor, Rufus Porter Esq., who has been sadly thwarted in the production of his grand development—the wonder of the age, we mean his aeroport or flying ship, or in plain words, a "steam balloon." This great machine, on account of its perigrinations, or rather those of its great designer, has changed its locality more than once, and its name oftener still. It is the aeroport—alias revoloidal spindle—alias flying machine, and a few other names of the jaw breaking stamp which we forget how to spell. Mr. Porter has been very unfortunate, he is really a doomed man by the prince of the power of the air. Lest he should steal a march on Satan by his flying balloon in navigating (as he has promised,) the atmosphere and sailing along to California in three days, his sable majesty has been keeping up a perpetual war with him. Some rowdies on Thanksgiving Day, rewarded the permission given to view the work, by clandestinely cutting the material of which the float is made. The rent produced by this was the next day increased by a blast of wind, and then a rain storm, followed by a freeze, caused considerable additional trouble. However, Mr. Porter has so far repaired all this mischief as to be waiting only for suitable weather to renew and complete his task. We presume, therefore, that nothing further will be undertaken on the aeroport until the spring has advanced. Mr. Porter professes to be more than ever sanguine of success. He announces in this number that the leading motive which prompted him to the invention of "the main principles of the aeroport was the liberation of Napoleon from St. Helena, where he was then imprisoned." So that the aeroport is no mushroom affair of yesterday.

We advise him when it is completed to make his first voyage across the Atlantic to Paris and pay his respects to Napoleon III, who no doubt, for the great development of a patriotic heart—the liberation of Napoleon the Great—will reward him abundantly, perhaps he may yet become President *du Departement de Grand Ballon.*

Notices of Inventions.

On page 20, this Vol., Scientific American, we gave a brief notice of a machine for turning irregular forms. stating that we would soon publish the engravings of it. We were induced to present that notice, as such machines have a very extended interest, and because the word of the owner was promised for the engravings. His promise has not been kept; we regret this for his own sake, and for the future we will take care and promise no engravings of a machine until we are sure of being able to present them. We make these statements because we have received letters asking why the said engravings did not appear according to the announcement made.

The Hot Air Ship made a trial trip on Wednesday, the 5th inst., and with a strong wind and tide in her favor, made about 11½ miles per hour.

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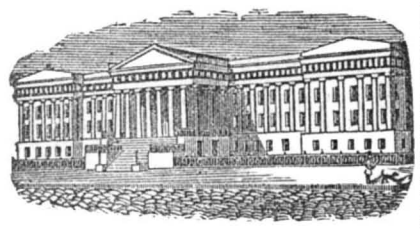

Reported Officially for the Scientific American

LIST OF PATENT CLAIMS

Issued from the United States Patent Office

FOR THE WEEK ENDING JANUARY 4, 1853.

HECKLING FLAX AND HEMP—By J. P Arnold, of Louisville, Ky.: I do not confine myself to any particular form or arrangement of the parts, so long as the machine is so constructed that it will operate as set forth.

I claim the method of heckling hemp by subjecting it to the action of a series of mixed beaters and combs, the teeth of the latter being of varying length —some of them projecting so far, and others beyond the beaters, and the whole operating substantially as set forth.

Also a rest, having a narrow slot open at one end in combination with a concave projecting beyond the end of the cylinder at the open end of the rest, as set forth.

FOR SAWING STONE—By Jas. T Bruen & Jas. G Wilson, of Hastings, N. Y.: We claim lifting the saws at or sufficiently near the middle of the stroke, to effect the specified purpose.

Also interposing india rubber or its equivalent, between the ways, and the inclined projections which lift the saw frame, as specified.

SELF-WINDING TELEGRAPHIC REGISTERS—By J J. Clark, of Philadelphia, Pa.: I do not claim the application of the click and ratchet whsel, operated by an electro-magnet, vibrating a lever to cause rotation and obtain power; but I claim regulating the current, through the coil of the electro-magnet of the self-winding apparatus, by means of the relative motion of the spring shaft and spring box, so that when the spring has been wound up to a certain point, that current shall be cut off, and the self-winding apparatus cease to act.

FOR PLANING MOULDINGS—By J. D. Dale, of Philadelphia, Pa.: I claim arranging a series of sets of moulding cutters or plane irons, side by side, along the length of a rotating stock, as specified, when this is combined with rotating saws or their equivalents, interposed and projecting beyond the periphery of the cutter for separating the several mouldings formed on one plank, as specified, whereby the operations of planing the several mouldings, and separating them, are performed at one and the same operation, and accuracy of work secured, as set forth.

FOR PLANING MOULDINGS—By J. D. Dale, of Philadelphia, Pa.: I do not limit myself to the number of knives or rollers to be used, nor to the manner of operating the rollers, as these may be varied at pleasure, nor to the use of all my improvements in one machine.

I claim attaching the planing iron to a plane stock, which is hinged to an adjustable sliding plate, as specified, by means of which combination the plane iron can be readily thrown up to be sharpened without the necessity of taking it out of the machine, as set forth.

Also the adjustable sliding plane, as described, when combined with the separate movable mouth-piece by the means as described, so that in setting the plane iron, a differential motion is given to the mouth-piece, in order to vary to any desired thickness the shaving, that when the plane is set to cut a thick or thin shaving, the mouth-piece shall receive a corresponding set, as described.

GRAIN WASHERS—By George & George W. Feaga, of Frederick, Md.: We claim the method, as described, of separating grain from smut, garlic, and other impurities by first washing it in a trough or reservoir of water, where the separation takes place, and then conveying the washed grain to a drying apparatus, where it is thoroughly dried, the whole operation being performed as set forth.

CRUTCHES—By J. S. Gallahar, Jr., of Washington, D. C: I claim, first, the revolving, plain, or corrugated spring top, in combination with an air cushion as described.

Second, in combination with the revolving spring top, the sliding joint applied to the staff of a crutch, in the manner described.

Third, in combination with the sliding staff, the revolving handle, extension ferrule, and elastic bulb, as set forth.

HILL SIDE PLOWS—By J. C. Bidwell & J. Hall, of Pittsburg, Pa.. executors of Samuel Hall, dec.: We claim the manner of arranging the mould boards upon the land side, to wit, placing their hinges at such a distance from each other on each side of the centre of the land side, that each mould board may be supported by the edges, and projection, as far as practicable, from the hinges and rest upon the grooves near the middle of the land side, as set forth.

HOSE PIPES—By Richard Hollings, of Boston, Mass.: I claim hanging the spread to the hose-pipe, by means of pins passing through the collar (which allow it to vibrate) in combination with adjusting apparatus, for varying the position of the spread in the manner specified.

LATHES FOR IRREGULAR FORMS—By B. F. Jenkins & Luke L. Knight, of Barre, Mass.: We do not claim the vibrating cutter cylinder and vibrating work carriage; but we claim giving the necessary relative vibrations to the cutter cylinder and work carriage, by crank pins or eccentrics upon the axes of a pair of toothed wheels, of which one is toothed all round its periphery, and the other upon any suitable portion of its periphery, the latter wheel having a constant rotary motion applied, which gives an intermittent rotary motion to the former wheel, whereby the said cutter cylinder and work carriage receive, the one a constant vibratory motion, and the other an intermittent vibratory motion, as described.

ORE WASHERS—By Merritt, Peckham & Lucius O Palmer, of Utica, N. Y.: We claim the interior cylinder with indented ends and wings, attached as described to operate as a discharging apparatus attached to the interior of an inclined revolving screen, as specified.

POTATO DIGGERS—By F. C. Schaffer, of Brooklyn, N. Y.: I am aware that machines have been previously used for digging potatoes, but in these machines the potatoes are dug or scooped from the hills by means of a concave or scoop formed of a single piece, the brush cylinder carrying the potatoes up the concave and into the receptacle. I therefore do not claim the above arrangement; but I claim the arrangement and combination of the scoop and endless apron, by which the potatoes are dug or scooped from the hills, and the dirt thoroughly separated therefrom, as they pass up the endless apron into the receptacle.

TONGUING AND GROOVING MACHINES—By Wm. Watson, of Chicago, Ill.: I claim the method, substantially as described, of tonguing and grooving boards, by means of knives arranged in the plane of the sides of the tongues or grooves, with their cutting edges inclined towards their rear extremities, so as to cut gradually deeper and deeper as the board passes them, when in combination with cutting instruments arranged between these side knives to reduce or remove the surplus wood which is severed by them, as specified.

PRINTING PRESSES—By Jeptha A. Wilkinson, of Fireplace, N. Y.: I am not aware that type have ever been formed with two parallel sides and two sides tapering on the radii of a circle, with a groove on one side and a projection on the other, so that on setting the parallel sides together, and the tapering sides together, and placing the projecting beads into the corresponding grooves, a cylinder is formed of firmly secured type, with their faces equi-distant from the centre, by which means the printing is effected, the same as though the whole were solid in a perfect cylindrical form, this constitutes the essence of my invention, and the other parts claimed are the means to use, to form, regulate, and work the main invention, and for parts growing out of or connected with the same.

First, the application of notches or grooves and heads, or projections on the shafts of type, tapered to the radii of a circle, for the purpose of locking said type together, and securing it in place on a cylinder, as described.

Second, the mode described, of forming column lines, rules, rings, and blocking, so that they are adapted to the cylinder and to the type, with notches and projections, to lock into the type and cylinder, as described.

Third, the mode described, of constructing the type cylinder, with heads, the one head having a bead or projection, the other with a notch or groove around in its face, near the edge, for the purpose of receiving and securing the type or other parts composed on the surface of said cylinders, such heads being fitted with means to compress and hold the type and parts in a cylindrical form, for the purpose of printing by a rotary movement, as described.

Fourth, the mode of constructing the compositor's stick in the form of the part of a cylinder, with flanches having beads or grooves, so as to hold the type in segments of a circle, while composing or setting up, preparatory to the placing of the same in the galley or proof cylinder, as described.

Fifth, the mode of constructing and applying the galley or proof cylinder, so that it shall receive and hold the type in circular form, from the composing stick, and retain the type and the needful parts in place, for correction and proof, and for transferring the same to the type cylinder, the parts being constructed and operating as destribed.

Sixth, the mode of forming and constructing the type holder or grab, to enclose, take hold of, and securely lift a mass of type from the galley or proof cylinder, and transfer the mass, either to the type cylinder or to a stack, for future use, or to reverse or vary either of these operations as may be needed, the instrument being constructed and operating in the manner described.

Seventh, the application and arrangement of the pulleys, bands, and guide plates, so placed and moving, so as to carry the sheet of paper from the press, in lines diverging, vertically, and conveying horizontally, under, between, and over the guide plates, thereby presenting the paper in a folded form, to the compressing rollers, as described.

Eighth, the application of the press rollers to compress the folded paper, and lead that out of the folding apparatus, and the combination of the standing roller, revolving shear, standing shear, valve, and cam, to effect the cutting of the folded paper, as it issues from the rollers, and guide the fresh cut edge clear of the standing shear, the whole being as described.

PIANOFORTE HAMMERS—By Rudolph Kreter, of New York City (assignor to Robert Nunns & John Clark): I claim, first, the application of the felt or other covering material to the whole set of hammer heads at one operation, as described.

Second, the clamp, bar, levers, pulleys, and block, with the sliding frame, in combination, as described, but without limiting myself to the precise shapes and proportions or positions of the said parts, provided the arrangement embrace the means of holding the set of hammer heads, and of bringing them to bear upon a table containing the strips of felt described, and also holding and moving the whole together either horizontally or vertically to and from the jaws of the vise, as set forth.

Third, the vise, in combination with and enclosing the bar and block, as described.

Fourth, the lip pieces, in combination with said vise, as described.

Fifth, the levers and springs in combination with the vise, for producing the pressure upon the sides of the felt during the passage of the hammer heads, between the jaws of the vise, as described.

Sixth, the method of increasing or diminishing the pressure of the levers upon the vise, by means of the movable bridge, in combination with the press, as described.

BOTTLE STOPPERS—By Walter Hunt (assignor to Charles T. Kipp), of New York City: I am aware that there have been other plans of self-acting stoppers, recently introduced, all of which have the same objection of producing an uncertain scattering or over discharge, and are constructed upon principles widely different from my plan.

I claim the combination of the circular cap and central shaft, viz, the swivel, pendulous and sliding motions, by means of which, without regard to which side of the stopper is upward, (when it is placed horizontally or nearly so) the under portion of the cap swings off from the flange, thereby producing a downward opening between the two for the requisite discharge of the liquids contained.

New Alloy.

In examining some silver ore from South America, at the government office in Paris, one piece was noticed, which, from appearance, was supposed to be exceedingly pure. However, to be quite certain, the examiner tried it, and from the resistance offered to the cutting tool, judged it to be 750 thousandths. The assay, however, gave as its purity 994 thousands, so that 6 thousands, only, of foreign materials sufficed to give it this resistance without depriving it of its malleability. From specimens of the same that were assayed, there were given, in analysis, 3½ thousands of iron, 2 thousandths of cobalt, and ½ thousandth of nickel. The chemist, M. Barruel, who made the analysis, has been experimenting with the same alloy in different proportions, and obtained the most perfect result, by mixing these three metals in equal parts. As there is no account of a similar alloy in any chemical work, he thinks that it might be profitably employed for various purposes, such as faucets of particular kinds, or medals where a more durable metal is required for the relief than what is generally employed as well as for many other uses.

The above is translated from the proceedings of the French Academy of Sciences for the month of December last.

Commissioner of Patents' Reports for 1851.

This report has taken a whole year from the time it was presented to Congress (January 1851) to find its way into print. We make this statement as a panegyric on the expeditious efforts of the present government at Washington in presenting useful information about inventions to our people. We believe that never since the P. O. was established has a printed report of its affairs been so long delayed. It is a shame. A change has come over the method of doing business in the Patent Office, so far as the Reports of the examiners are concerned. Hitherto it has been customary for each Examiner in the Patent Office to present a brief report of the inventions examined and patented in his department during the year, and to present a succint account of their principal features. No such reports were made in 1851. The reason given, is a "pressure of business, and because charges had been made of partiality in the selection of inventions noticed."

There is a very excellent report of Mr. Riddle, respecting the World's Fair, some extracts from which we will hereafter present to our readers, who will find the same full of interest.

The first part of this Report contains a protest by ex-Commissioner Ewbank, against the supervision exercised over the Patent Office department, by the Secretary of the Interior. After Mr. Ewbank was appointed, his rights and privileges, as exercised by former Commissioners of Patents, were abriged and interfered with by the Secretary of the Interior; this called forth an incensed rebuke from the Hon. Edmund Burke, the former Commissioner, who had upheld the rights of inventors; and so far as we know, Mr. Ewbank made no public answer, but it seems he did not submit to the same in silence, so far as it related to the action of the Secretary of the Interior, nay, he even addressed a communication to him, wherein he states that the Patent Office "should be wholly freed from political influences," and on a difference of opinion between him and that officer, the same was referred to the Attorney General, who gave his opinion that the Commissioner of Patents, all his clerks, and every person about the Patent Office were simply mere clerks to the said Secretary, and that the Commissioner of Patents could not pay out a cent but under the control of that officer. Mr. Ewbank was then compelled to submit, but not without presenting some resolute and pungent reasons against the evils of such supervision.

The public and ourselves have blamed him wrongfully, as this report shows, for yielding so much in silence (as was thought.) Next week, however, we will present some of the curious pieces of this report, and show that the semi-official article in the "Republic," in answer to the "Scientific American" was a misrepresentation of facts, concerning what we stated in reference to the Secretary of the Interior endeavoring to obtain the wing of the Patent Office, in contravention to the real object for which that building was intended, and for which it is now required.

The Patent Office has been in a transition state ever since the present party came into power. We do not discuss party politics, we only make this statement as a positive fact. There has been mismanagement somewhere. All the old examiners have left the office during the past year, with the exception of Dr. Gale, who is, we believe, the only old examiner now in the Patent Office. H. B. Renwick, Esq., examiner of that class of subjects embracing engineering and hydraulics, has recently resigned, also the assistant machinist, Jas. Ewbank.

British Patent Office.

The British government has decided that letters patent will not be granted by them for the colonies, even upon the payment of extra fees. This is the information we have received from our agents in London. By this decision, inventors are debarred from obtaining protection for their inventions in the British Colonies. This is a recent decision of the British Patent Office. Of the mental calibre and administrative qualities of any man or class of men, no one can form a competent opinion, unless he is acquainted with the business over which such an administrator presides. Many, (too many) suppose that government officers sit away up in the clouds; that they have qualities of mind far above common men. This is not so; it is true now as it was a century ago, when Oxenstiern told his son to go to a convention of celebrated diplomatists "and see with how little wisdom the world was governed."

The Age of Steam.

On Wednesday evening (29th ult.,) Geo. W. Curtis, Esq., delivered one of the course of "Popular Lectures at the Tabernacle. The subject chosen was "The Age of Steam." The attendance was not so numerous as it should have been—steam not being such a fashionable subject as the life of the *Dean* (Swift). His lecture was characterized by some very happy hits. This is truly the age of iron and steam, it rules the land and sea. The locomotive and steamship are the civilizing agents of modern times. He said, "the children of this age are baptised in steam, and handle the lightning with perfect safety.—The literary aspect of affairs is also improved by steam. We read by steam. No rebel Persian can aim a deadly blow at the Shah—no affairs of Louis Napoleon—no accident can happen unless they are related to us either by steam or by telegraph. Before the Duke of Wellington was buried the squatters in the far West were reading his life. At the immortal Webster's death the news was conveyed to the principal cities of the Union almost instantaneously.

"Our artists need not be ashamed of themselves. A few days ago a painting was sold at auction for $1,300, which was painted by a young American. It is said by some that steam ruins the fine arts; but it is not so—it rather serves to improve their condition.—Every country is celebrated for excelling each other in some particular branch of business, and not knowing much about the others: the Yankees have superficial knowledge of every branch of business, and every art, and in some of which they excel all other nations. It was true that the men who entered the colleges of this country did not receive such a profound education as in those of other countries, but still they received what they required, which is a "superficial one." In a railroad car, when you are told that you are going at the rate of forty miles an hour, it does not seem to surprise you. He then alluded to the accidents that happen from steam explosions, and said that those who use steam ought to be careful—for, if by steam we sin, by steam we shall be surely punished. In this age a man can travel from New York to Buffalo in less than a day by railroad, and looks upon that mode of conveyance as safe as the canal of twenty years ago. In all our prosperity let faith, hope, and charity be our conductors; and if we take them for guides, we will have no reason to fear any heavy misfortunes.

In our last number, under the head of Iron Making, there appeared an article descriptive of a new process for obtaining wrought iron direct from the ore, in which it was stated that measures had been taken to secure a patent. It is, however, requisite to mention that the present application is not intended for the main features of the invention, as it has been already patented, but for valuable additional improvements. We are, moreover, empowered to add that applications for patents have been made in foreign countries. For further particulars address by letter or otherwise, to James Renton, or A. H. Brown, of Newark, N. J.

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TO CORRESPONDENTS.

L. G., of N. Y.—We think favorable of your improved method of preventing car axles from breaking, but may change our views after examining a sketch and description which you had better send us.

W. M. L., of La.—We have ordered the machine you want, but shall not be able to obtain it until about four weeks; the delay is unavoidable on our part.

M. M., of La.—We think favorable of your ideas in regard to boxwood, but there is no chance for a patent.

W. W., of L. I.—No patent could be obtained for the article you mention, and we advise you not to make an attempt.

S. C. H., of Ohio.—You ask if a single engine with a fly-wheel, will give as steady a motion to stones as a double engine with the cranks set at right angles. If the engine is worked up to its limit of power it will not. It has been found that for milling purposes it is difficult to get a steady motion from steam power. The engine or engines must be powerful and there must be plenty of steam so as to allow them to work easy. You state that two thirty feet boilers of three feet diameter do not drive any more than two run of stone. Have you fire bridges under them—do you burn coal or wood? Boilers that use coal should never be more than six times the length of their diameter. In every case we advise the employment of tubular boilers, and the use of pure water in them. There should be nine square feet of heating surface for each horse power; by making your calculations you can determine whether your boilers are correct or not.

D. B., of N. J.—You may rest assured that lime will never supersede coal; a pound of coal will convert far more water into steam than a pound of lime, this is the test.

E. L. N., of Mass.—Guess you have discovered the article by this time without the aid of *those* spectacles.

E. S., of Me.—We are the agents of Mr. Avery for procuring his foreign patents, and think we know what we are about when we pronounce it a first-rate machine for the price.

J. M. B., of Del.—We have shipped several concentric Lathes to Philadelphia, but the names of the parties who purchased we have entirely forgotten.

J. T., of Phila.—The "Mechanic" we referred to died three or four years ago.

S. S., of N. Y.—If we understand your drawing, we believe your invention to be patentable; the claim you suggest would have to be greatly modified however.

J. Y., of Ohio—The error you speak of was corrected before the papers were sent to the Patent Office. An engraving of your invention would cost $10.

G. W. H., of N. Y.—We fail to discover any thing patentable in your Match Safe, although they are a very pretty article of manufacture.

D. R., of N. C.—Your subscription will expire at No. 26, Vol. 9. It was a mistake of ours in receiving the price of binding twice.

H. Van de W., of N. Y.—Your wheel so closely resembles the one illustrated in the 14th number, present volume Sci. Am.. that it would not afford sufficient interest to our readers to warrant our publishing an engraving of it.

R, S., of Ill.—We have duly examined the sketch of your alleged improvement in Rotary Engines, and recognize in it an old acquaintance: we have been familiar with the same plan for some years; see Vol. 4, Sci. Am.

I. H. G., of Iowa—We did not answer your inquiry because we were unable to do so. The first question is a "poser," and we know what you mean but know of no one who can approximate to anything like a true estimate; we think there is no machine which does the work you speak of.

H. G. R., of Tenn.—We have examined the sketch of your alleged improvement in Churns, and cannot discover anything new or patentable in it; we have seen the same plan before.

F. V. D., of Mich.—Machines to be operated by the action and re-action of waves is well known and have been variously modified; you may have some new contrivance, but it is doubtful.

G. R. Selkirk, of Michigan City, Ind., wishes to purchase a suit of Submarine Armor of the most approved construction.

J. F. J., of N. C.—We have handed over your letter to an engine builder.

S. F H., of Boston—You can send us a full and complete description of your Car Seat for examination.

H. & R., of N. H.—We never publish engravings entirely devoid of letters of reference to enable us to explain the operation of the invention

R. L. O., of Pa.—We do not see the advantages you claim for the device mentioned in your former letter; you might make an experiment and fully satisfy yourself.

G. C., of N. Y.—It is no easy matter to arrive at your meaning from the brief description and sketches you have presented. The idea presented is that of a double tier of buckets on the wheel, the upper the percussion, the lower the re-action; this form of wheel is not new, and so far as percussion and re-action is concerned the application is an anomaly.

C. L., of Ct.—You may perhaps have seen accounts of thus allowing the exhaust to escape into a cold water tank; we have so used it ourselves; but the extract showed how far they were behind in Europe; it is the same with the gas patent; it will never benefit the patentees where coal can be purchased.

E. A. W., of N. Y.—Mason and Dixon's Line acquired its name from the surveyors. Any work on Natural Philosophy will give you the information about the atmosphere; the answer would be too long for us to give.

W. R. R, of N. Y.—The hollow shaft, for the weight of metal, is the strongest, but certainly a solid cast-iron shaft is as strong as a hollaw one of the same diameter.

J. C., of N. J.—Brass is the best metal that we are acquainted with for counters for store advertisements.

Money received on account of Patent Office business for the week ending Saturday, Jan. 8:

G. D, of N. Y., $30; N. C. T., of N. Y., $35: J. E., of N. Y., $25; J. C. S, of Pa., $30; H. L. F. G., of Mich., $25; E. B. W., of N. H., $30; F. J. T., of N. Y., $30; C. W. G., of N. Y., $10; J. & C. D., of Pa., $30; D. W. K, of Va., $25; D. M., of N. Y., $20; J. H., of N. Y., $37.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, Jan. 8:

J. E., of N. Y.; D. M., of N. Y.: O. S., of R. I.; W. F., of Pa.; J. H., of N. Y.: N. C. T., of N. Y.

A Chapter of Suggestions, &c.

PATENT CLAIMS—Persons desiring the claims of any invention which has been patented within fourteen years, can obtain a copy by addressing a letter to this office—stating the name of the patentee, and enclosing one dollar as fee for copying

PATENTEES—Remember we are always willing to execute and publish engravings of your inventions, provided they are on interesting subjects, and have never appeared in any other publication. No engravings are inserted in our columns that have appeared in any other journal in this country, and we must be permitted to have the engraving executed to suit our own columns in size and style. Barely the expense of the engraving is charged by us, and the wood-cuts may be claimed by the inventor, and subsequently used to advantage in other journals.

BACK NUMBERS AND VOLUMES—In reply to many interrogatories as to what back numbers and volumes of the Scientific American can be furnished, we make the following statement:—Of Volumes 1, 2 and 3—none. Of Volume 4, about 20 Nos., price 50 cts. Of Volume 5, all but four numbers, price, in sheets, $1. Of Volume 6, all; price in sheets, $2; bound, $2.75. Of Vol. 7, all; price in sheets, $2; bound, $2,75. Of Vol. 8, all the back numbers to January 1st (No. 16), but none previous.

GIVE INTELLIGIBLE DIRECTIONS—We often receive letters with money enclosed, requesting the paper sent for the amount of the enclosure, but no name of State given, and often with the name of the post office also omitted. Persons should be careful to write their names plainly when they address publishers, and to name the post office at which they wish to receive their paper, and the State in which the post office is located.

PATENT LAWS, AND GUIDE TO INVENTORS.—We publish, and have for sale, the Patent Laws of the United States. The pamphlet contains not only the laws but all information touching the rules and regulation of the Patent Office. Price 12 1-2 cts. per copy.

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American and Foreign Patent Agency

IMPORTANT TO INVENTORS.---The undersigned having for several years been extensively engaged in procuring Letters Patent for new mechanical and chemical inventions, offer their services to inventors upon the most reasonable terms. All business entrusted to their charge is strictly confidential. Private consultations are held with inventors at their office from 9 A. M., until 4 P. M. Inventors, however, need not incur the expense of attending in person, as the preliminaries can all be arranged by letter. Models can be sent with safety by express or any other convenient medium. They should not be over 1 foot square in size, if possible.

Having Agents located in the chief cities of Europe, our facilities for obtaining Foreign Patents are unequalled. This branch of our business receives the especial attention of one of the members of the firm, who is prepared to advise with inventors and manufacturers at all times, relating to Foreign Patents.

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North Point Foundry and Machine Works,
18 4 Jersey City, N. J.

W. P. N. FITZGERALD, Counsellor at Law has recently resigned the office of principal Examiner of Patents, which he has held for many years, and is ready to assist, professionally, in the preparation and trial of patent causes before the U. S. Courts in any of the States, and before the Supreme Court of the United States. He also acts as Counsel in cases before the Patent Office, and on appeals therefrom, but does not prepare applications for Patents Office corner of E and 8th sts., Washington, D. C. 18 tf

PREVENTING OF INCRUSTATION in Steam Boilers—The inventor of a never-failing and extremely cheap remedy, which has been tried successfully for two years, with the most different qualities of water, offers to communicate it for the benefit of the public at a moderate price. Post-paid letters, enclosing $5, will receive prompt answer if directed to the undersigned, who is prepared to give the best of reference. A. SCHELLER.
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PORTER'S PATENT GRADUATING VALVE FORGE TUYERE (illustrated in this paper Sept. 6th, 1851) is unequalled for durability and economy, and warranted to save full 25 per cent. Hundreds have recently been introduced in this city and elsewhere, all of which work like a charm. Address J. H. BURNETT, 308 Broadway, N. Y. 15 4*

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WANTED—A good DYER and FINISHER of woolen goods. We are most particular about the former qualification. For further particulars address us by mail or otherwise.
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STEAM ENGINES FOR SALE—We offer for sale two Engines and Boilers, as follows: one 8 horse, horizontal, cylinder 7 inches bore, 16 inch stroke, on a cast-iron bed, fly wheel, driving pulley, governor, pump, pipes, etc.; has never been used. The Boiler has been used by the maker about one year. It is cylinder, horizontal, 16 feet long, 30 inch diameter, has a steam chamber, try-cocks, check and safety valves: price, $600.

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EXHIBITION OF WORKS OF AMERICAN Industry at Washington City.—The first exhibition of the Metropolitan Mechanics' Institute will be opened on Thursday, the 24th of February, 1853, in the new and splendid hall of the east wing of the Patent Office, one of the largest and most magnificent rooms in the United States, being 275 feet long by 70 feet wide. To this exhibition the manufacturers, mechanics, artists, and inventors, from all portions of the Union, are cordially invited to contribute. The hall will be opened for the reception of goods on Monday, tha 14th of February, and the exhibition will positively close on or before Thursday night, March 17. Circulars, containing detailed instructions, will be forwarded and any further information given, on application (post-paid) to the Corresponding Secretary, Charles F. Stansbury, to whom all communications on the business of the Institute should be addressed 8tf

WOODBURY'S PATENT PLANING Machines —I have recently improved the manufacture of my Patent Planing Machines, making them strong and easy to operate, and am now ready to sell my 24 inch Surfacing Machines for $700, and 14 inch Surfacing Machines for $650 each. I will warrant, by a special contract, that ONE of my aforesaid machines will plane as many boards or plank as two of the Woodworth machines in the same time, and do it better and with less power. I also manufacture a superior Tonguing and Grooving Machine for $350, which can be either attached to the Planing Machine, or worked separately. JOSEPH P. WOODBURY, Patentee, Border st, East Boston, Mass. 13tf

MACHINERY.—S. C. HILLS, No. 12 Platt-st. N. Y. dealer in Steam Engines, Boilers, Iron Planers, Lathes, Universal Chucks, Drills; Kase's, Von Schmidt's and other Pumps; Johnson's Shingle Machines; Woodworth's, Daniel's and Law's Planing machines; Dick's Presses, Punches and Shears; Morticing and Tennoning machines; Belting; machinery oil, Beal's patent Cob and Corn mills; Burr mill and Grindstones; Lead and Iron Pipe &c. Letters to be noticed must be post-paid. 13tf

A. B. ELY, Counsellor at Law, 52 Washington st., Boston, will give particular attention to Patent Cases. Refers to Munn & Co., Scientific American. 16tf

LEONARD'S MACHINERY DEPOT, 109 Pearl-st. and 60 Beaver, N. Y.—Leather Banding Manufactory, N. Y.—Machinists's Tools, a large assortment from the "Lowell Machine Shop," and other celebrated makers. Also a general supply of mechanics' and manufacturers' articles, and a superior quality of oak-tanned Leather Belting.
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LATHES FOR BROOM HANDLES, Etc.—We continue to sell Alcott's Concentric Lathe, which is adapted to turning Windsor Chair Legs, Pillars, Rods and Rounds; Hoe Handles, Fork Handles and Broom Handles.

This Lathe is capable of turning under two inches diameter, with only the trouble of changing the dies and pattern to the size required. It will turn smooth over swells or depressions of 3-4 to the inch and work as smoothly as on a straight line—and does excellent work. Sold without frames for the low price of $25—boxed and shipped with directions for setting up. Address (post.paid) MUNN & CO.
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FALES & GRAY (Successors to TRACY & FALES), RAILROAD CAR MANUFACTURERS—Grove Works, Hartford, Connecticut. Passenger, freight, and all other descriptions of railroad cars and locomotive tenders made to order promptly. 1tf

SHINGLES, SHINGLES, SHINGLES—WOOD'S latest improvement in Shingle Machines is becoming more generally used than any other ever invented, and is unquestionably the best machine now in use; it produces shingles from all kinds of timber in a very perfect and rapid manner. Machines and rights for sale. Apply to JAMES D. JOHNSON, Bridgeport, Ct. 9tf

C. B. HUTCHINSON'S PATENT STAVE Cutting Machines, the best in use, and applicable alike to thick or thin staves; also his Head Cutting and Turning, and Stave Jointing Machines.

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NEW HAVEN MANUFACTURING COMpany, Tool Builders, New Haven, Conn., (successors to Scranton & Parshley) have now on hand $25,000 worth of Machinist's Tools, consisting of power planers, to plane from 5 to 12 feet; slide lathes from 6 to 18 feet long; 3 size hand lathes, with or without shears; counter shafts, to fit all sizes and kinds of universal chuck gear cutting engines; drill presses, index plates, bolt cutters, and 3 size slide rests. The Co are also manufacturing steam engines: All of the above tools are of the best quality, and are for sale at 25 per cent. less than any other tools in the market. Cuts and list of prices can be had by addressing as above, post-paid. Warehouse No. 12 Platt st., New York, S. C. HILLS, Agent N. H. Man'g Co. 45tf

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SCIENTIFIC MUSEUM.

Arrow Root in Florida.

The Everglades are separated from the sea by a strip of land varying from four te ten miles in breadth, and from two to three hundred miles in length, almost completely encircling it, and covered with a rich growth of pine. Scattered about at their feet is a modest little plant, the arrow-root; the tops of which resemble tansey. Covered by a thin soil it is easily dug and removed. Its appearance is similar to the sweet potatoe, but more irregular in shape, and with a thicker, tougher covering. Carried by mules to the mill situated upon the edge of some one of the numerous streams running from the glades to the sea, they are thrown into a large cylinder, the circumference of which is formed of bars of wood, and separated from each other a few inches. The cylinder revolves and a stream of water constantly flows upon the roots; they are thus thoroughly cleansed, and their surface coming in contact with the rough edge of the transverse bars, the roots are peeled and ready for the grinder. This machine reduces them to a pulp, which is passed through vats of fresh water, and thoroughly cleansed from all impurities. The mass is now a milky white, resembling curd, and must be spread upon frames with cotton-duck bottoms, to the thickness of three inches, and exposed to the sun. This drying process is quite rapid in that hot climate, and is the last preparation (save raking the pulp and breaking the mass into small grains) in the manufacture. It is then boxed and ready for market. The whole process of digging, peeling, washing, grinding, and drying, may be gone through with between sun and sun.

The simple manner of manufacturing arrow-root requires but a small outlay for machinery, and the mills now making the article are all small and the production not extensive. It makes excellent starch, and the supply of roots is almost unlimited, and the production can be easily increased, so that if the potatoes fail, the pine woods of Florida will turn out a substitute.

Rough Plate Glass for the Roofs of Hot Houses.

Some time ago rough plate glass was proposed for hot houses in place of the clear translucent kind. In respect to its use the London Gardeners' Chronicle says:—The garden committee directed the rough rolled plate glass to be tried in the garden of the Horticultural Society at Chiswick. For this purpose a small pit, unventilated except by sliding the sashes, and heated by hot water pipes, was selected. In the last week of Aug., 1851, this pit was filled with soft wooded plants, which can only be kept in health in the presence of a large quantity of light. The experiment was thus set in action without any special care having been taken to make it succeed; on the contrary, everything was against success. It is needless to say that the months of October, November, and December were more than usually gloomy, and that neither January nor February offered any advantage over those months in ordinary years. In addition to this it was often necessary to leave the plants in the dark all day long, in consequence of the sashes being covered with frozen mats, which could not be removed.—Nevertheless, and notwithstanding these impediments, the experiment was perfectly successful. On the plants being produced, at a subsequent meeting of the Horticultural Society, by Mr. Gordon, to whom the experiment was confided, they appeared in the most beautiful health, with firm, short wood, broad, thick, clean, bright-green leaves, and in the case of the Gesneea and Pentas, with flowers perfect in color, size, and form. In short, it may be said, without the least exaggeration, that more perfect examples of high cultivation were never seen, and few so perfect. It was clear that there had been no deficiency of any element or condition which is required for the most perfect health. This conclusive proof of the excellence of rough plate glass possesses the highest agricultural interest. It shows that gardeners are now secured effectually from the scorching effects of the sun during summer, and that all the costly as well as inconvenient contrivances for shading may in future be dispensed with."

Wells, Pumps, &c.

(Continued from page 136)

Air Vessels in Pumps—Some experiments have been made by Messrs. Kirchweger and Prusman, engineers, of Hanover, on the positive effect produced upon the action of pumps by the application of air vessels on the suction pipes. Air vessels have been applied for many years on delivery pipes, but it is only lately that their value has been properly estimated, although it is obvious that it is of as much importance that the pump should be filled with water, as that the delivery should be constant.

The apparatus employed by the German engineers is represented in section in fig. 1. A is a reservoir, which represents the source whence the pump draws its water; B is the suction pipe, and C is a valve-chest, containing a ball-valve, surmounted by a cock discharging at the side. The plug of the cock is stationary, whilst the shell is moved by the handle, E. D is the air vessel.

Fig. 2 shows the details of the valve on a larger scale.

It is obvious that, by causing the cock to revolve by means of the handle, E, a certain volume of water will escape each time the passage is opened, the height of water column in the pipe, E, answering to the pressure of the atmosphere in causing the water to fill the pump.

The result of the trials was, that when the air vessel was removed, and the opening stopped, an increased velocity of rotation of the cock gave less water; but with the air vessel the increase of velocity gave more water.

The trials were made with different speeds

Figure 1.

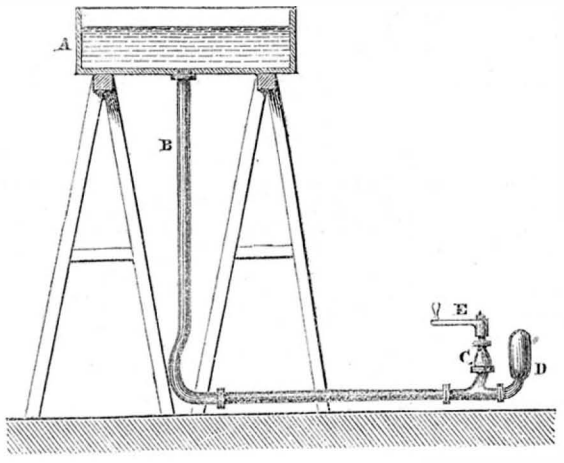
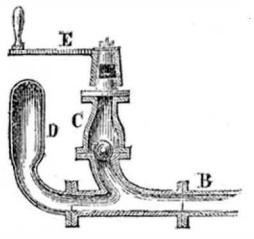


Figure 2.



and different pressures of water, with the results shown in the following table:—

No. of turns per minute.	Gallons of water delivered per min. under a mean pressure of 17 ft.	12½ ft.	8½ ft.	2¾ ft.
With air vessel.				
80	12·9	12·78	8·79	2·83
100	15·6	15·43	11·25	4·82
120	17·15	16·63	12·23	5·44
140	18·28	16·75	12·98	5·54
Without air vessel.				
80	9·45	8·62	6·902	2.36
100	8·03	8·08	6·05	1·98
120	6·55	6 54	5·42	1·88
140	5·42	6 29	5·17	1·51

The capacity of the air vessel is 66 cubic inches.

The weight of the ball valve 2·315 lbs.

The area of the valve seat=11.5 inches.

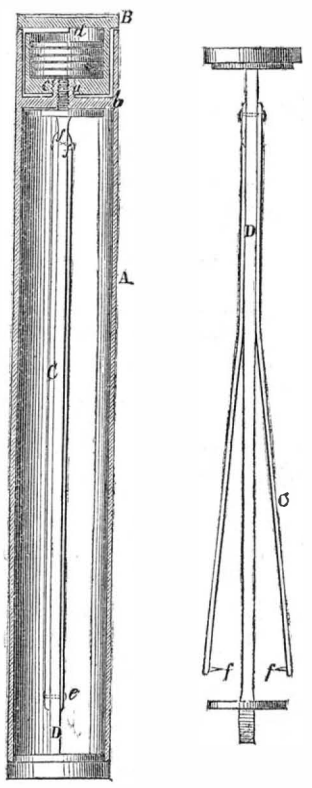
The smallest diameter of the feed pipe is 1·48 inches.

The quantities delivered at 80 to 100 turns are the mean of four trials; those of 120 and 140 turns are the mean of 3 only.

If these trials are to be taken as the exact result which may be expected under similar circumstances with a pump, it is evident that a large increase of duty may be expected, by adding an air vessel on the suction side of a pump, working at a high speed. For, it will be observed that, whilst at 80 turns the increase is only 20 per cent., at 100 turns it is 133 per cent., at 120 turns 189 per cent., and at 140 turns 266 per cent.

Counterfeit Coin Detector.

Fig. 1. Fig. 2.

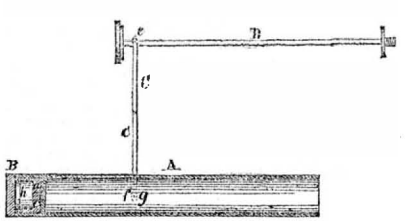


The annexed engravings are views of an instrument for detecting counterfeit coins, invented by H. G. Robinson, of Schuylkill Haven, Penn.

Figure 1 is a longitudinal vertical section of the instrument taken through the centre. Fig. 2 is a detached view of the clamps, and fig. 3 is a longitudinal vertical section of the case, the clamps being withdrawn and applied to the case for the purpose of weighing the coin in the receptacle at one end of the case. Similar letters refer to like parts.

A represents a cylindrical case or tube, having at one end a receptacle or gauge box, B. This box is also cylindrical, and fits within the case, A, and is secured there by a screw, *a*, attached to a partition, *b*, which screw passes into a nut, *c*, in the bottom of the box, B. The receptacle or gauge box, B, may be sufficiently large or deep to contain several pieces of coin. At the upper or outer end of the box there is a recess, *d*, cut through and around just one half the circumference of the box; this recess will consequently admit a coin to be passed through it as large as the box will contain. The width of the recess must equal the width of a genuine coin of such a size as the box is capable of holding. The remaining portion of the case, A, incloses a pair of clamps, C; these clamps are attached at one end to a rod, D, by a pivot, *e*. The opposite ends of

Fig. 3.



the clamps are provided with points, *f f*. The rod, D, has a screw thread cut upon it, at one end, which screw-thread passes into the centre of the screw, *a*, as the rod, D, is turned; and the rod and clamps are thereby secured within the case, A. In order to detect counterfeit coin, the gauge box, B, is withdrawn from the case, A. If the coin will pass snugly through the recess, *d*, into the box, it must of course be of the same dimensions as a genuine coin, and if a counterfeit it will be lighter. The clamps, C, are then withdrawn from the case, A, and the small points, *f f*, are inserted in fulcrum holes, *g g*, one on each side of the case. These fulcrum holes are placed at certain points in the case, so that when a genuine coin is in the box, B, and the box adjusted within the case, A, the case will exactly balance or be in equilibrium, when it is suspended at the fulcrum holes, (see fig. 3), the coin being represented by *h*. If a counterfeit coin be of the same weight as a genuine one it will necessarily be larger, and will not pass through the recess into the box, B, weighing, in this case, would be unnecessary.

If the receptacle or gauge box, B, contains several coins, they must be all removed when a coin is to be tested by weighing, and the coin to be tested should be moistened to cause it to adhere to the end of the box, as seen in fig. 3. as a change of position of the coin would cause great inaccuracy in weight. Bank notes may be wound around the rod, D, and clamps, C, within the case, and the implement will thus form a convenient receptacle for both coin and bank notes, equally as portable as the ordinary wallet or pocket-book.

Measures have been taken to secure a patent, and more information may be obtained by letter addressed to the inventor.

Scientific Prediction Fulfilled.

The Boston Journal states that McKay, of the clipper Sovereign of the Seas, built in Boston, previous to sailing from this city, (N. Y.,) for San Francisco, in August last, addressed a latter to Lieut. Maury, of the National Observatory at Washington, requesting a copy of the fourth edition of his Sailing Directions, for the use of the voyage. Lieut. Maury answered the letter, stating that if Capt. McKay would follow the directions laid down, the Sovereign of the Seas would be able to cross the Equator in the Pacific on or before the 25th day of October, and would reach San Francisco in one hundred and three days.

The Sovereign of the Seas crossed the line only 14 hours behind the predicted time, and dropped anchor in the harbor of San Francisco in one hundred and three days and two hours after leaving New York.

This prediction on a voyage of 17,000 miles, is a forcible illustration of the benefits of modern scientific research.

MECHANICS

Manufacturers and Inventors.

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